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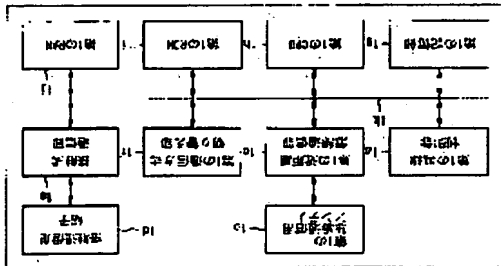
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(54) WIRELESS COMMUNICATION APPARATUS AND PROGRAM FOR  
CONTROLLING THE WIRELESS COMMUNICATION APPARATUS

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a wireless communication apparatus suitable for simply identifying a communication opposite party and suitable for reducing time consumed until communication is established.

SOLUTION: A first embodiment 1 of the wireless communication apparatus comprises: a first wireless control section 1a; a first wireless communication antenna 1b; a first near distance wireless communication section 1c; a contact communication use terminal 1d; a contact communication section 1e; a first communication system switching section 1f; a first storage section 1g; a first CPU 1h; a first ROM 1i; a first RAM 1j; and a first bus 1k.



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**CLAIMS**

[Claim(s)]

[Claim 1] The radio communication equipment characterized by having a switchable communication-mode change means for a super-short distance radio means to perform radio of a super-short distance, a short-distance radio means to perform radio of a short distance, and the radio by said super-short distance radio means and the radio by said short-distance radio means.

[Claim 2] The radio communication equipment characterized by having a switchable communication-mode change means for a super-short distance radio means to perform radio of a super-short distance, a middle distance radio means to perform middle-distance radio, and the radio by said super-short distance radio means and the radio by said middle distance radio means.

[Claim 3] The radio communication equipment according to claim 1 or 2 characterized by communicating radio information required in order to perform radio other than a communications partner and said super-short distance with said super-short distance radio means.

[Claim 4] The radio communication equipment characterized by having a switchable communication-mode change means for the antenna for radio, a radio means to perform radio of a data signal using the antenna for radio concerned, a contact terminal, the contact process means of communications that communicates said data signal through the contact terminal concerned, and the radio by said radio means and the communication link by said contact process means of communications.

[Claim 5] The radio communication equipment according to claim 4 characterized by communicating radio information required in order for a communications partner and said radio means to perform radio by said contact process means of communications.

[Claim 6] The radio communication equipment characterized by having a switchable

communication-mode change means for a communications partner, the electromagnetic means of communications which performs radio of said data signal by electromagnetic induction, and the radio by said radio means and the radio by said electromagnetic means of communications using the antenna for radio, a radio means to perform radio of a data signal using the antenna for radio concerned, a coil, and the coil concerned.

[Claim 7] The radio communication equipment according to claim 6 characterized by communicating radio information required in order for said communications partner and said radio means to perform radio by said electromagnetic means of communications.

[Claim 8] The antenna for short-distance radio, the antenna for super-short distance radio, and a contact terminal. When the contact terminal of other equipments contacts a radio means to perform radio using either among said antenna for short-distance radio, and said antenna for super-short distance radio, and said contact terminal of self-equipment. The radio communication equipment characterized by having the antenna change means which changes automatically the antenna which said radio means uses to said antenna for super-short distance radio.

[Claim 9] Said radio means is a radio communication equipment according to claim 8 characterized by having the signal amplifier which amplifies the data signal outputted from said antenna.

[Claim 10] Said radio means is a radio communication equipment according to claim 9 characterized by amplifying said data signal by said signal amplifier only in the radio which used said antenna for short-distance radio.

[Claim 11] The radio communication equipment according to claim 8 to 10 characterized by performing the communication link of radio information required in order for a communications partner and said radio means to perform radio by the radio using said antenna for super-short distance radio.

[Claim 12] The radio communications system characterized by having a radio communication equipment according to claim 1 to 11 two or more, communicating the information for radio required in order to perform the communications partner and radio of the purpose, and performing said communications partner and radio using the acquired radio information concerned by the radio of a super-short distance.

[Claim 13] The super-short distance radio step which is a program for radio device control for controlling the radio processing in a radio communication equipment according to claim 1, and performs radio processing of a super-short distance with said super-short distance radio means, The short-distance radio step which performs

radio processing of a short distance with said short-distance radio means. The communications processing change step which performs change processing with the super-short distance radio processing by said super-short distance radio step, and the short-distance radio processing by said short-distance radio step with said communication-mode change means. The program for radio device control characterized by preparation \*\*\*\*\*.

[Claim 14] The super-short distance radio step which is a program for radio device control for controlling the radio processing in a radio communication equipment according to claim 2, and performs radio processing of a super-short distance with said super-short distance radio means. The middle distance radio step which performs middle-distance radio processing with said middle distance radio means. The communications processing change step which performs change processing with the super-short distance radio processing by said super-short distance radio step, and the middle distance radio processing by said middle distance radio step with said communication-mode change means. The program for radio device control characterized by preparation \*\*\*\*\*.

[Claim 15] The program for radio device control according to claim 13 or 14 characterized by performing the communication link of radio information required in order to perform radio other than a communications partner and said super-short distance in said super-short distance radio step.

[Claim 16] It is a program for radio device control for controlling the radio processing in a radio communication equipment according to claim 4. The radio step which performs radio processing of a data signal performed using said antenna for radio by said radio means. The contact process communication link step which performs the communications processing of said data signal performed by said contact process means of communications through said contact terminal. The program for radio device control characterized by having the communications processing change step which performs change processing with the radio processing by said radio step, and the communications processing by said contact process communication link step with said communication-mode change means.

[Claim 17] The radio communication equipment according to claim 16 characterized by performing the communications processing of radio information required for the radio processing performed in a communications partner and said radio step in said contact process communication link step.

[Claim 18] It is a program for radio device control for controlling the radio processing in a radio communication equipment according to claim 6. The radio step which

performs radio processing of a data signal performed using said antenna for radio by said radio means. The electromagnetic communication link step which performs radio processing of said data signal performed by the electromagnetic induction using a coil by said electromagnetic means of communications. The program for radio device control characterized by having the communications processing change step which performs change processing with the radio processing by said radio step, and the radio processing by said electromagnetic communication link step with said communication-mode change means.

[Claim 19] The program for radio device control according to claim 18 characterized by performing the communications processing of radio information required for the radio processing performed in said communications partner and said radio step in said electromagnetic communication link step.

[Claim 20] It is a program for radio device control for controlling the radio processing in a radio communication equipment according to claim 6. The radio step which performs radio processing performed by said radio means using either among said antenna for short-distance radio, and said antenna for super-short distance radio. The radio processing change step which changes automatically the radio processing performed in said radio step to super-short distance radio processing in which said antenna for super-short distance radio was used when the contact terminal of other equipments contacts said contact terminal of self-equipment. The program for radio device control characterized by preparation \*\*\*\*\*.

[Claim 21] The radio communication equipment according to claim 20 characterized by performing signal magnification processing which amplifies the data signal outputted from said antenna in said radio step.

[Claim 22] The program for radio device control according to claim 21 characterized by performing said signal magnification processing only in the radio using said antenna for short-distance radio in said radio step.

[Claim 23] The program for radio device control according to claim 20 to 22 characterized by performing the communications processing of radio information required for the radio processing performed in a communications partner and said radio step in the radio step using said antenna for super-short distance radio.

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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the equipment which transmits and receives a data signal by wireless, especially, specifies a communications partner simply and relates to a suitable radio communication equipment to bring forward the time amount to communication link initiation.

[0002]

[Description of the Prior Art] I had the information on the device required [ when not knowing the device ID of the partner who wants to connect ] of the conventional radio in order to perform radio, such as Device ID, to all the devices that exist within limits which a wireless electric wave reaches transmitted, those information was received, and the approach which a user chooses a communications partner from the inside, and connects was used.

[0003]

[Problem(s) to be Solved by the Invention] However, by the above-mentioned conventional approach, when there are many devices for a communication link on the outskirts, while it is necessary to choose the target communications partner and selection of a device becomes a troublesome activity out of many received devices ID, in order to do the activity which chooses reception and a communications partner from all the devices of communication link within the limits for information, there is a problem that time amount is light by communication link initiation.

[0004] Then, this invention is made paying attention to the unsolved technical problem which such a Prior art has, and it aims at offering a suitable radio communication equipment shortening time amount until a communication link is established, and the program for radio equipment control while it is suitable to specify a communications

partner simply.

[0005]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the radio communication equipment according to claim 1 concerning this invention is characterized by having a switchable communication-mode change means for a super-short distance radio means to perform radio of a super-short distance, a short-distance radio means to perform radio of a short distance, and the radio by said super-short distance radio means and the radio by said short-distance radio means.

[0006] With such a configuration, it is possible to communicate the data signal in a super-short distance with a super-short distance radio means. It is possible to communicate the data signal in a short distance with a short-distance radio means. Further with a communication-mode change means Since it is possible to change to the communication link by super-short distance means of communications or the radio by short-distance means of communications, it is useful to reduction of power consumption, compaction of the time amount to data communication initiation, etc. by using the communication mode according to a communication link application properly.

[0007] Here, suppose that a super-short distance is the distance from a contact location to several cm, and a short distance is the distance from the maximum distance of a super-short distance to several m. Moreover, a radio communication equipment according to claim 2 is characterized by having a switchable communication-mode change means for a super-short distance radio means to perform radio of a super-short distance, a middle distance radio means to perform middle-distance radio, and the radio by said super-short distance radio means and the radio by said middle distance radio means.

[0008] That is, it is possible to communicate the data signal in a super-short distance with a super-short distance radio means. It is possible to communicate a middle-distance data signal with a middle distance radio means. Further with a communication-mode change means Since it is possible to change to the communication link by super-short distance means of communications or the radio by middle distance means of communications, it is useful to reduction of power consumption, compaction of the time amount to data communication initiation, etc. by using the communication mode according to a communication link application properly.

[0009] Here, suppose that middle distance is the distance from the maximum distance of a short distance to dozens of meters. Moreover, it is characterized by communicating radio information required in order that invention concerning claim 3 may perform radio other than a communications partner and said super-short

distance in a radio communication equipment according to claim 1 or 2 with said super-short distance radio means.

[0010] That is, it is characterized by communicating radio information required in order for a communications partner and said radio means to perform radio by said contact process means of communications. That is, it was made to communicate with a super-short distance radio means about radio information required in order to perform radio [say / receiving the proper ID for identifying a communications partner required in order to perform radio etc. from a communications partner, or notifying the discernment ID of a self-equipment proper etc. to a communications partner conversely]. Therefore, since it becomes the communication link of a super-short distance, while preventing transmitting the password and identification information of equipment to unrelated equipment to unrelated equipment, it is useful to becoming possible to start radio easily and shortening the time amount to communication link initiation using the acquired radio information.

[0011] Moreover, the radio communication equipment according to claim 4 is characterized by having a switchable communication-mode change means for the antenna for radio, a radio means to perform radio of a data signal using the antenna for radio concerned, a contact terminal, the contact process means of communications that communicates said data signal through the contact terminal concerned, and the radio by said radio means and the communication link by said contact process means of communications.

[0012] Since with such a configuration it is possible to perform radio using the antenna for radio with a radio means, it is possible to perform the communication link which minded the contact terminal by contact process means of communications and it is still more possible to change the radio by the radio means or the communication link by contact process means of communications with a communication-mode change means, proper use of the communication mode according to a communication link application can be performed, and it is convenient. Moreover, it is characterized by communicating radio information required in order that invention concerning claim 5 may perform radio with a communications partner and said radio means in a radio communication equipment according to claim 4 by said contact process means of communications.

[0013] That is, it was made to communicate by contact process means of communications about radio information required in order to perform radio [say / receiving the proper ID for identifying a communications partner required in order to perform radio etc. from a communications partner, or notifying the discernment ID of a

self-equipment proper etc. to a communications partner conversely]. Therefore, since it becomes the communication link of 1 to 1 by contact, while preventing transmitting the password and identification information of equipment to unrelated equipment, it is useful to becoming possible to start radio easily and shortening the time amount to communication link initiation using the acquired radio information.

[0014] Moreover, the radio communication equipment according to claim 6 is characterized by having a switchable communication-mode change means for a communications partner, the electromagnetic means of communications which performs radio of said data signal by electromagnetic induction, and the radio by said radio means and the radio by said electromagnetic means of communications using the antenna for radio, a radio means to perform radio of a data signal using the antenna for radio concerned, a coil, and the coil concerned.

[0015] That is, electromagnetic means of communications is made to perform radio by the electromagnetic induction using a coil. Since this method can be communicated by little power consumption, it is using properly with the radio by the antenna for radio by the application, and it becomes possible to reduce power consumption. Moreover, it is characterized by communicating radio information required in order that invention concerning claim 7 may perform radio with said communications partner and said radio means in a radio communication equipment according to claim 6 by said electromagnetic means of communications.

[0016] That is, it was made to communicate by electromagnetic means of communications about the radio information that receive the proper ID for identifying a communications partner required in order for a radio means to perform radio etc. from a communications partner, or the discernment ID of a self-equipment proper etc. is conversely notified to a communications partner. Therefore, it is useful to becoming possible to start radio easily and bringing forward the time amount to initiation of radio using the acquired radio information, while it reduces transmitting the password and identification information of equipment to another unrelated equipment, since the radio by electromagnetic induction turns into a communication link of a short distance extremely.

[0017] Moreover, the radio communication equipment according to claim 8 concerning this invention The antenna for short-distance radio, the antenna for super-short distance radio, and a contact terminal, When the contact terminal of other equipments contacts a radio means to perform radio using either among said antenna for short-distance radio, and said antenna for super-short distance radio, and said contact terminal of self-equipment it is characterized by having the antenna change

means which changes automatically the antenna which said radio means uses to said antenna for super-short distance radio.

[0018] The short-distance radio which used the antenna for short-distance radio with the radio means when it was such a configuration, When it is possible to perform super-short distance radio using the antenna for super-short distance radio and the contact terminal of other equipments contacts the contact terminal of self-equipment further. Since the antenna which a radio means uses is automatically changed to the antenna for super-short distance radio with an antenna change means. If the equipment is equipped with the same contact terminal when performing radio among other radio communication equipments which exist close at hand, super-short distance radio can be performed only by contacting the contact terminals, and it is convenient.

[0019] Moreover, invention concerning claim 9 is characterized by equipping said radio means with the signal amplifier which amplifies the data signal outputted from said antenna in the radio communication equipment according to claim 8. That is, a radio means amplifies the data signal outputted from an antenna by the signal amplifier. Moreover, invention concerning claim 10 is characterized by said radio means amplifying said data signal by said signal amplifier only in the radio which used said antenna for short-distance radio in the radio communication equipment according to claim 9.

[0020] That is, in the radio using the antenna for super-short distance radio of a super-short distance, a radio means is outputted from an antenna, without amplifying the data signal by the signal amplifier, and is useful to holding down consumption of useless power. Moreover, it is characterized by performing the communication link of radio information required in order that invention concerning claim 11 may perform radio with a communications partner and said radio means in a radio communication equipment according to claim 8 to 10 by the radio using said antenna for short-distance radio.

[0021] That is, the radio using the antenna for super-short distance radio was made to perform the communication link of the radio information that receive the proper ID for identifying a communications partner required in order for a radio means to perform radio etc. from a communications partner, or the discernment ID of a self-equipment proper etc. is conversely notified to a communications partner. Therefore, since it becomes the communication link of a short distance extremely, while reducing transmitting the password and identification information of equipment to another unrelated equipment, it is useful to becoming possible to start

short-distance radio easily, and bringing forward the time amount to the improvement in security, and initiation of radio using the acquired radio information.

[0022] Moreover, the radio communications system according to claim 12 concerning this invention is equipped with a radio communication equipment according to claim 1 to 11 two or more, communicates the information for radio required in order to perform a communications partner and radio, and is characterized by performing said communications partner and radio using the acquired radio information concerned by the radio of a super-short distance. That is, it is the system which performs radio with the said equipments using a radio communication equipment according to claim 1 to 11, and since the operation effectiveness overlaps, it omits a publication.

[0023] Moreover, the program for radio device control according to claim 13 concerning this invention. The super-short distance radio step which is a program for radio device control for controlling the radio processing in a radio communication equipment according to claim 1, and performs radio processing of a super-short distance with said super-short distance radio means, The short-distance radio step which performs radio processing of a short distance with said short-distance radio means, It is characterized by having the communications processing change step which performs change processing with the super-short distance radio processing by said super-short distance radio step, and the short-distance radio processing by said short-distance radio step with said communication-mode change means.

[0024] Moreover, the program for radio device control according to claim 14 concerning this invention. The super-short distance radio step which is a program for radio device control for controlling the radio processing in a radio communication equipment according to claim 2, and performs radio processing of a super-short distance with said super-short distance radio means, The middle distance radio step which performs middle-distance radio processing with said middle distance radio means, It is characterized by having the communications processing change step which performs change processing with the super-short distance radio processing by said super-short distance radio step, and the middle distance radio processing by said middle distance radio step with said communication-mode change means.

[0025] Moreover, it is characterized by performing the communication link of radio information required in order that invention concerning claim 15 may perform radio other than a communications partner and said super-short distance in the program for radio device control according to claim 13 or 14 in said super-short distance radio step. Moreover, the program for radio device control according to claim 16 concerning this invention. It is a program for radio device control for controlling the radio

processing in a radio communication equipment according to claim 4. The radio step which performs radio processing of a data signal performed using said antenna for radio by said radio means. The contact process communication link step which performs the communications processing of said data signal performed by said contact process means of communications through said contact terminal. It is characterized by having the communications processing change step which performs change processing with the radio processing by said radio step, and the communications processing by said contact process communication link step with said communication-mode change means.

[0026] Moreover, invention concerning claim 17 is characterized by performing the communications processing of radio information required for the radio processing performed in a communications partner and said radio step in said contact process communication link step in the program for radio device control according to claim 16. Moreover, the program for radio device control according to claim 18 concerning this invention It is a program for radio device control for controlling the radio processing in a radio communication equipment according to claim 6. The radio step which performs radio processing of a data signal performed using said antenna for radio by said radio means. The electromagnetic communication link step which performs radio processing of said data signal performed by the electromagnetic induction using a coil by said electromagnetic means of communications. It is characterized by having the communications processing change step which performs change processing with the radio processing by said radio step, and the radio processing by said electromagnetic communication link step with said communication-mode change means.

[0027] Moreover, invention concerning claim 19 is characterized by performing the communications processing of radio information required for the radio processing performed in said communications partner and said radio step in said electromagnetic communication link step in the program for radio device control according to claim 18. Moreover, the program for radio device control according to claim 20 concerning this invention It is a program for radio device control for controlling the radio processing in a radio communication equipment according to claim 6. The radio step which performs radio processing performed by said radio means using either among said antenna for short-distance radio, and said antenna for super-short distance radio. The radio processing change step which changes automatically the radio processing performed in said radio step to super-short distance radio processing in which said antenna for super-short distance radio was used when the contact terminal of other equipments contacts said contact terminal of self-equipment. It is characterized by preparation

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[0028] Moreover, invention concerning claim 21 is characterized by performing signal magnification processing which amplifies the data signal outputted from said antenna by said signal amplifier in said radio step in the program for radio device control according to claim 20. Moreover, it is characterized by invention concerning claim 22 performing said signal magnification processing only in the radio using said antenna for short-distance radio in said radio step in the program for radio control according to claim 21.

[0029] Moreover, invention concerning claim 23 is characterized by performing the communications processing of radio information required for the radio processing performed in a communications partner and said radio step in the radio step using said antenna for super-short distance radio in the program for radio device control according to claim 20 to 22. The program for radio device control according to claim 13 to 23 is a program for controlling the radio processing in a radio communication equipment according to claim 1 to 9 here, and since the effectiveness overlaps, it omits a publication.

[0030]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained based on a drawing. Drawing 1 thru/or drawing 9 are drawings showing the gestalt of operation of the radio communication equipment concerning this invention. First, the 1st example of a configuration of the radio communication equipment concerning this invention is explained based on drawing 1. Drawing 1 is the block diagram showing the 1st example of a configuration of the radio communication equipment concerning this invention. As shown in drawing 1, the 1st example 1 of a configuration of a radio communication equipment 1st radio control section 1a, 1st antenna 1b for radio, and 1st short-distance Radio Communications Department 1c. It has composition equipped with 1d of terminals for a contact communication link, contact process communications department 1e, 1f of 1st communication-mode change section, 1g of 1st storage section and 1st CPU1h, 1st ROM1i, 1st RAM1j, and 1st bus 1k.

[0031] 1st radio control-section 1a controls radio processing, and performs generation of the transmission data in the transmitting processing and reception of a data signal by wireless, and transmission of a processing instruction. 1st antenna 1b for radio is an antenna for performing radio of a short distance. 1st short-distance Radio Communications Department 1c performs processing which outputs the data for transmission from 1st antenna 1f for radio b to a short distance according to the

instruction from 1st radio control-section 1a.

[0032] 1d of terminals for a contact communication link is for transmitting data by contact for the same terminal of other equipments. Contact process communications department 1e is for performing data transceiver processing between other communication equipment through 1d of terminals for a contact communication link, and processes a monitor, data transmission processing, etc. of a contact condition. If of 1st communication-mode change section is for carrying out control which changes the short-distance radio by 1st short-distance Radio Communications Department 1c, and the communication link by contact process communications department 1e, and performs only one processing according to the communication mode set up by actuation of the control unit which is not illustrated.

[0033] 1g of 1st storage section is for memorizing the data transmitted and received by the communication link through radio or 1d of terminals for a contact communication link. 1st CPU1h is for performing the program for control memorized by 1st ROM1i for controlling processing of each part of the above. 1st ROM1i has memorized the above-mentioned program for control, and also has memorized the identification information of an equipment proper etc.

[0034] 1st RAM1j is for memorizing required data, in case 1st CPU1h performs the above-mentioned program for control. 1st bus 1k is a data communication way for performing data communication between each part of the above. Next, more concrete actuation is explained based on drawing 4. Drawing 4 is drawing showing signs that the communication devices of the same type are performing radio, (a) is drawing showing the situation of radio using 1d of terminals for a contact communication link by contact process communications department 1e, and (b) is drawing showing the situation of radio using the 1st antenna for radio by 1st short-distance Radio Communications Department 1c.

[0035] First, the communication link using 1d of terminals for a contact communication link is performed by contacting 1st terminal 40a for a contact communication link of the 1st radio communication equipment 40, and 2nd terminal 41a for a contact communication link of the 2nd radio communication equipment 41, as shown in drawing 4 (a). In the gestalt of this operation, transmission and reception of the information for a communication link required in order to communicate with a communications partner to perform short-distance radio by the super-short distance radio by this terminal for a contact communication link will be performed.

[0036] Furthermore, as information for a communication link, information, such as identification information of the equipment proper memorized by 1st ROM1i and a

protocol of short-distance radio, is transmitted and received beforehand, it is read from 1st ROM1i by contact process communications department 1e, and transmission processing is performed. And if the communication link information on a communications partner is acquired by this communication link, the change of a communication mode will be performed by 1f of 1st communication-mode change section in the short-distance radio method by 1st short-distance Radio Communications Department 1c from the super-short distance radio method by contact process communications department 1e. Furthermore, if a communication mode changes to the short-distance radio method by 1st short-distance Radio Communications Department 1c, after 1st short-distance Radio Communications Department 1c reads the data to transmit from the 1st storage section based on the communication link information on the acquired communications partner and performs modulation processing etc., as shown in drawing 4 (b), it will perform short-distance radio processing which outputs the data signal modulated from the antenna of self-equipment. In addition, processing of these each part is performed by 1st ROM1i's memorizing and performing the program for \*\*\* control by 1st CPU1h. [0037] Furthermore, the flow of actuation of the control program in the 1st example 1 of a configuration of a radio communication equipment is explained based on drawing 7. Drawing 7 is a flow chart which shows processing of the program for control in the 1st example 1 of a configuration of a radio communication equipment of operation. As shown in drawing 7, it shifts to step S700 first, and by the control unit which is not illustrated, it is set as the super-short distance radio mode in which the contact terminal for a communication link according a communication mode to contact process communications department 1e was used, and shifts to step S702. [0038] At step S702, change processing is performed by 1f of 1st communication-mode change section, and it shifts to step S704 by it so that it may become the communication mode for which the communication mode used the contact terminal for a communication link. If it shifts to step S704, the communications processing by contact process communications department 1e will be started, and it will shift to step S706. At step S706, when it judges that 1d of terminals for a contact communication link judged and contacted [ whether the same terminal for a contact communication link of other communication devices was contacted, and ] (Yes), it shifts to step S708, and when that is not right, (No) stands by until it contacts. [0039] Since contact was checked when it shifted to step S708, transceiver processing of communication link information is performed, and further, it judges



whether the information for a communication link from a communications partner was acquired, and when judged with having acquired communication link information (Yes), it shifts to step S710, and when that is not right, (No) continues processing until it contacts and acquires the information for a communication link. In the gestalt of this operation here, the information for a communication link also transmits the thing of self-equipment to a communications partner, and after both are in the condition with the mutual information for a communication link, it shifts to the following step.

[0040] When it shifts to step S710, a communication mode is automatically set as short-distance radio mode, and shifts to step S712. At step S712, change processing is performed by 1f of 1st communication-mode change section, and it shifts to step S714 by it so that a communication mode may turn into a short-distance radio method by 1st short-distance Radio Communications Department 1c. At step S714, the short-distance radio which used the 1st antenna for radio is started by 1st short-distance Radio Communications Department 1c. Here, 1st short-distance Radio Communications Department 1c reads the data to transmit from 1g of 1st storage section, and short-distance radio performs modulation processing to which the data signal is compounded with a subcarrier, and is performed with changing into the data for transmission and outputting from 1st antenna 1 for radio b.

[0041] Furthermore, the 2nd example of a configuration of the radio communication equipment concerning this invention is explained based on drawing 2. Drawing 2 is the block diagram showing the 2nd example of a configuration of the radio communication equipment concerning this invention. As shown in drawing 2, the 2nd example 2 of a configuration of a radio communication equipment With 2nd radio control section 2a, the 2nd antenna 2 for radio, and the 2nd short distance Radio Communications Department 2 It has composition equipped with coil 2d for radio, electromagnetic Radio Communications Department 2e, 2f of 2nd communication-mode change section, 2g of 2nd storage section and 2nd CPU2h, 2nd ROM2i, 2nd RAM2j, and 2nd bus 2k.

[0042] 2nd radio control-section 2a controls radio processing, and performs generation of the transmission data in the transmitting processing and reception of a data signal by wireless, and transmission of a processing instruction. 2nd antenna 2b for radio is an antenna for performing radio of a short distance. 2nd short-distance Radio Communications Department 2c performs processing which outputs the data for transmission from 2nd antenna 2b for radio to a short distance according to the instruction from 2nd radio control-section 2a.

[0043] Coil 2d for radio is for causing electromagnetic induction and carrying out the

radio transmission of the data by approach with the same coil. Electromagnetic Radio Communications Department 2e performs processing for transmitting data to other communication equipment using the electromagnetic induction by coil 2d for radio, and performs processing for transmitting and receiving data by electromagnetic induction. 2f of 2nd communication-mode change section is for carrying out control which changes the short-distance radio by 2nd short-distance Radio Communications Department 2c, and the super-short distance radio by electromagnetic Radio Communications Department 2e, and is made to perform only one processing according to the communicate mode set up by actuation of the control unit which is not illustrated.

[0044] 2g of 2nd storage section is for memorizing the data transmitted and received by the super-short distance radio which used short-distance radio and coil 2d for radio which used 2nd antenna 2b for radio. 2nd CPU2h is for performing the program for control memorized by 2nd ROM2i for controlling processing of each part of the above. 2nd ROM2i has memorized the above-mentioned program for control, and also has memorized the identification information of an equipment proper.

[0045] 2nd RAM2j is for memorizing required data, in case 1st CPU2h performs the above-mentioned program for control. 2nd bus 2k is a data communication way for performing data communication between each part of the above. Next, more concrete actuation is explained based on drawing 5. Drawing 5 is drawing showing signs that radio by the communication devices of the same type is performed, (a) is drawing showing the communicative situation using coil 2d for radio by electromagnetic communications department 2e, and (b) is drawing showing the situation of radio using 2nd antenna 2b for radio by 2nd short-distance Radio Communications Department 2c.

[0046] First, the communication link using coil 2d for radio is performed by bringing 1st output section 50a of the 3rd radio communication equipment 50, and 2nd output section 51a of the 4th radio communication equipment 51 close to the distance which can communicate, as shown in drawing 5 (a). In the gestalt of this operation, transmission and reception of communication link information required in order to perform a target communications partner and short-distance radio will be performed by the radio using electromagnetic induction with this coil for radio. In order to perform a radio transmission, modulation processing etc. is performed, and the data of the information for a communication link which information, such as identification information of the equipment proper memorized by 2nd ROM2i and a communicative protocol, was beforehand transmitted as communication link information, and was read

from 2nd ROM2i by electromagnetic Radio Communications Department 2e are transmitted to a phase hand through coil 2d for radio.

[0047] And if the communication link information on a communications partner is acquired by the super-short distance radio by electromagnetic Radio Communications Department 2e, the change of a communication mode will be performed by 2f of 2nd communication-mode change section in the short-distance radio method by 1st short-distance Radio Communications Department 2c from the super-short distance radio method by electromagnetic Radio Communications Department 2e. Furthermore, if a communication mode changes to the short-distance radio method by 2nd short-distance Radio Communications Department 2c, after 2nd short-distance Radio Communications Department 2c reads the data to transmit from 2g of 2nd storage section based on the communication link information on the communications partner acquired by super-short distance radio and performs modulation processing etc., as shown in drawing 5 (b), it will perform the short-distance radio processing which outputs the data signal modulated from the antenna of self-equipment. In addition, processing of these each part is performed by 2nd ROM2i's memorizing and performing the program for \*\*\* control by 2nd CPU2h.

[0048] Furthermore, the flow of actuation of the control program in the 2nd example 2 of a configuration of a radio communication equipment is explained based on drawing 8. Drawing 8 is a flow chart which shows processing of the program for control in the 2nd example 2 of a configuration of a radio communication equipment of operation. As shown in drawing 8, it shifts to step S800 first, and by the control unit which is not illustrated, it is set as the super-short distance radio mode in which coil 2d for radio according a communication mode to electromagnetic Radio Communications Department 2e was used, and shifts to step S802.

[0049] At step S802, change processing is performed by 2f of 2nd communication-mode change section, and it shifts to step S804 by it so that it may become the super-short distance radio method with which the communication mode used coil 2d for radio. If it shifts to step S804, the super-short distance radio processing by electromagnetic Radio Communications Department 2e will be started, and it will shift to step S806. At step S806, when judged with coil 2d for radio having judged whether it moved within limits which can radiocommunicate by electromagnetic induction with the same coil for radio of other communication devices, and having moved (Yes), it shifts to step S808, and when that is not right, (No) stands by until it moves to within the limits.

[0050] Since the migration to within the limits was checked when it shifted to step

S808, transceiver processing of the information for a communication link is performed, and further, it judges whether the information for a communication link from a communications partner was acquired, and processing is continued until it shifts to step S810 when judged with having acquired communication link information (Yes), (No) moves to within the limits when that is not right, and it acquires the information for a communication link. In the gestalt of this operation here, the information for a communication link also transmits the thing of self-equipment to a communications partner, and after both are in the condition with the mutual information for a communication link, it shifts to the following step.

[0051] When it shifts to step S810, a communication mode is automatically set as short-distance radio mode, and shifts to step S812. At step S812, change processing is performed by 2f of 2nd communication-mode change section, and it shifts to step S814 by it so that a communication mode may turn into a short-distance radio method by 2nd short-distance Radio Communications Department 2c. At step S814, the short-distance radio which used 2nd antenna 2b for radio is started by 2nd short-distance Radio Communications Department 2c. Here, 2nd short-distance Radio Communications Department 2c reads the data to transmit from 2g of 2nd storage section, and short-distance radio performs modulation processing to which the data signal is compounded with a subcarrier, and is performed with changing into the data for transmission and outputting from 2nd antenna 2b for radio.

[0052] Furthermore, the 3rd example of a configuration of the radio communication equipment concerning this invention is explained based on drawing 3. Drawing 3 is the block diagram showing the 3rd example of a configuration of the radio communication equipment concerning this invention. As shown in drawing 3, the 3rd example 3 of a configuration of a radio communication equipment The 3rd radio control-section 3a, Radio Communications Department 3b, and antenna 3c for super-short distance radio, It has composition equipped with antenna 3d for short-distance radio, antenna change section 3e, 3f of signal amplifiers, 3g of 3rd storage section and 3rd CPU3h, 3rd ROM3i, 3rd RAM3j, and 3rd bus 3k.

[0053] 3rd radio control-section 3a controls the communications processing of the data based on wireless, and performs control of transmitting processing or reception, generation of the data for a communication link, etc. Radio Communications Department 3b performs radio using antenna 3f for super-short distance radio c, or antenna 3d for short-distance radio, and processes based on the control instruction from 3rd radio control-section 3a. Antenna 3c for super-short distance radio is an antenna for performing the communications partner and super-short distance radio

which are performed when the contact terminal of other equipments contacts the contact terminal of the self-equipment which is not illustrated.

[0054] Antenna 3d for short-distance radio is an antenna for performing the communications partner and the short-distance radio of the purpose. Antenna change section 3e changes an antenna to antenna 3c for super-short distance radio automatically, when the contact terminal of other equipments contacts the contact terminal of self-equipment, and when performing radio of a short distance, it performs processing automatically changed with the antenna for short-distance radio. Here, according to the existence of contact of a contact terminal, and the acquisition situation of communication link information, an antenna is changed automatically.

[0055] 3f of signal amplifiers is for amplifying the signal outputted from antenna 3d for short-distance radio. When performing super-short distance radio which used antenna 3c for super-short distance radio in the gestalt of this operation here, it outputs from an antenna, without amplifying a signal. 3g of 3rd storage section is for memorizing the data transmitted and received by super-short distance radio and short-distance radio.

[0056] 3rd CPU3h is for performing the program for control memorized by 3rd ROM3i for controlling processing of each part of the above. 3rd ROM3i has memorized the above-mentioned program for control, and also has memorized the identification information of an equipment proper, and information for a communication link, such as a password. 3rd RAM3j is for memorizing required data, in case 3rd CPU3h performs the above-mentioned program for control.

[0057] 3rd bus 3k is a data communication way for performing data communication between each part of the above. Next, more concrete actuation is explained based on drawing 6. Drawing 6 is drawing showing signs that radio by the communication devices of the same type which have a contact terminal is performed, (a) is drawing showing the situation using antenna 3c for super-short distance radio of super-short distance radio, and (b) is drawing showing the situation using antenna 3d for short-distance radio of short-distance radio.

[0058] First, radio mode is set up by actuation of the control unit which is not illustrated. 3rd radio control-section 3a transmits mode information to antenna change section 3e according to this mode setting. Here, when the contact terminal of self-equipment touches the contact terminal of other equipments, processing which chooses antenna 3c for super-short distance radio by antenna change section 3e is performed. If Radio Communications Department 3b is the radio of a super-short distance in the gestalt of this operation, transmitting processing of the data for

transmission (here information for a communication link) will be performed without minding 3f of signal amplifiers.

[0059] On the other hand, the contact terminal of self-equipment contacts the contact terminal of other equipments, and does not shine, and when communication link information is acquisition ending, antenna change section 3e chooses antenna 3d for short-distance radio, and Radio Communications Department 3b makes the data signal for transmission amplify in 3f of signal amplifiers, and outputs the data signal for transmission from antenna 3d for short-distance radio. That is, the communication link using antenna 3c for super-short distance radio is performed by contacting 3rd terminal 60a for a contact communication link of the 5th radio communication equipment 60, and 4th terminal 61a for a contact communication link of the 6th radio communication equipment 61, as shown in drawing 6 (a). In the gestalt of this operation, transmission and reception of the information for a communication link required in order for this super-short distance radio to perform a target communications partner and short-distance radio will be performed. As information for a communication link, the information on the identification information of the equipment proper memorized by 3rd ROM2i, the password for obtaining communication link authorization, etc. is transmitted beforehand. By 3rd radio control-section 3a In order to perform a radio transmission, modulation processing etc. is performed, and the data of the information for a communication link read from 3rd ROM3i are outputted by Radio Communications Department 3b from antenna 3for super-short distance radio c.

[0060] And when acquiring the information for a communication link and performing a communications partner and short-distance radio As antenna 3d for short-distance radio is chosen by antenna change section 3e and it is shown in drawing 6 (b) The 5th radio communication equipment 60 and 6th radio communication equipment 61 are in the condition of having separated mutually within the limits of the short distance, and short-distance radio is performed with outputting the signal amplified by Radio Communications Department 3b from antenna 3d for short-distance radio through 3f of signal amplifiers.

[0061] Furthermore, the flow of actuation of the control program in the 3rd example 3 of a configuration of a radio communication equipment is explained based on drawing 10. Drawing 9 is a flow chart which shows processing of the program for control in the 3rd example 3 of a configuration of a radio communication equipment of operation. As shown in drawing 9, when it shifts to step S900 first, it judges whether there was any contact of contact terminals and there is contact (Yes), it shifts to step S902, and

when that is not right, (No) shifts to step S908.

[0062] When it shifts to step S902, antenna 3c for super-short distance radio is chosen by antenna change section 3e, and it shifts to step S904 by it. If it shifts to step S904, by Radio Communications Department 3b, super-short distance radio using antenna 3c for super-short distance radio will be performed, and it will shift to step S906. At step S906, when judged with having judged whether radio was completed or not and having ended (Yes), communications processing is ended, and when that is not right, (No) shifts to step S900.

[0063] When judged with on the other hand judging and acquiring whether the information for a communication link is acquired when there is no contact of a contact terminal and it shifts to step S908 at step S900 (Yes), it shifts to step S910, and when that is not right, (No) shifts to step S900. If it shifts to step S910, by antenna change section 3e, antenna 3d for short-distance radio will be chosen as an antenna which Radio Communications Department 3b uses, and it will shift to step S912.

[0064] At step S912, by Radio Communications Department 3b, short-distance radio using antenna 3d for short-distance radio is performed, and it shifts to step S906. As mentioned above, since it becomes possible to reduce that those information is received by unrelated equipment since according to the gestalt of the above-mentioned implementation the radio of a super-short distance is made to perform the discernment data of a communication device proper, and transmission and reception of a password in case radio is performed, it is useful to improvement in security.

[0065] Moreover, since the information for a communication link is quickly [ simply and ] acquirable in the 1st example 1 of a configuration which acquired the information for a communication link by the super-short distance communication link by 1d of terminals for a contact communication link, it is possible to shorten the time amount to radio initiation. Moreover, since the information for a communication link is simply acquirable in the 2nd example 2 of a configuration which acquired the information for a communication link by the super-short distance communication link by coil 2d for radio, it is possible to shorten the time amount to radio initiation.

[0066] Moreover, since it communicates by changing to the antenna for super-short distance radio automatically when there is contact of a contact terminal in the 3rd example 3 of a configuration which changed the class of antenna used for a communication link according to the existence of contact of a contact terminal, the information for a communication link can be acquired simply and quickly, the time amount to radio initiation can be shortened, and it is convenient. Moreover, in the 3rd

example 3 of a configuration, since he is trying to output from an antenna at the time of the super-short distance radio using the antenna for super-short distance radio, without amplifying a signal, it becomes reduction of power consumption.

[0067] The short-distance radio processing by 1st radio control section 1a and 1st short-distance Radio Communications Department 1c which are shown in drawing 1 here it corresponds to a short-distance radio means according to claim 1 and a radio means according to claim 4. 1st antenna 1b for radio it corresponds to the antenna for radio according to claim 4. 1d of terminals for a contact communication link it corresponds to a contact terminal according to claim 4, contact process communications department 1e corresponds to claim 4 and contact process means of communications according to claim 5, and 1f of 1st communication-mode change section supports claims 1 and 4 and the communication-mode change means of five publications.

[0068] Furthermore, the short-distance radio processing by 2nd radio control section 2a and 2nd short-distance Radio Communications Department 2c which are shown in drawing 2 it corresponds to a short-distance radio means according to claim 1 and claim 6, and the radio means of seven publications. 2nd antenna 2b for radio it corresponds to the antenna for radio according to claim 6. Coil 2d for radio it corresponds to a coil according to claim 6, electromagnetic Radio Communications Department 2e corresponds to claim 6 and electromagnetic means of communications according to claim 7, and 2f of 2nd communication-mode change section corresponds to claims 1 and 4 and the communication-mode change means of six publications.

[0069] Furthermore, the radio by the 3rd radio control-section 3a and Radio Communications Department 3b which are shown in drawing 3 corresponds to a wireless transmitting means according to claim 8 to 11, and 3d of antenna change sections supports the antenna change means according to claim 8.

[0070]

[Effect of the Invention] As explained above, according to the radio communication equipment according to claim 1 to 7 concerning this invention Since the radio and super-short distance radio of the short distance using the antenna for radio - middle distance were made switchable to the method of arbitration with the communication-mode change means Since radio was started after being able to perform proper use of the communication mode according to a communication link application, and reduction of power consumption being possible and acquiring the information for a communication link required for radio by super-short distance communication link While reducing information transmission to unrelated equipment,

the time amount compaction to communication link initiation is attained.

[0071] According to the radio communication equipment according to claim 8 to 11, moreover, with an antenna change means Since the communication mode made the class of antenna switchable as it is at either of the antenna for super-short distance radio, and the antenna for short-distance radio according to the existence of contact of a contact terminal Since radio was started after acquiring the information for a communication link required for radio by super-short distance communication link Since the time amount compaction to communication link initiation was attained, and it was made to output from an antenna further, without amplifying a signal while reducing information transmission to unrelated equipment when it was super-short distance radio, it is useful to reduction of power consumption.

[Translation done.]

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**TECHNICAL FIELD**

[Field of the Invention] This invention relates to the equipment which transmits and receives a data signal by wireless, especially, specifies a communications partner simply and relates to a suitable radio communication equipment to bring forward the time amount to communication link initiation.

[Translation done.]

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**PRIOR ART**

[Description of the Prior Art] I had the information on the device required [ when not knowing the device ID of the partner who wants to connect ] of the conventional radio in order to perform radio, such as Device ID, to all the devices that exist within limits which a wireless electric wave reaches transmitted, those information was received, and the approach which a user chooses a communications partner from the inside, and connects was used.

[Translation done.]

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**EFFECT OF THE INVENTION**

[Effect of the Invention] As explained above, according to the radio communication equipment according to claim 1 to 7 concerning this invention Since the radio and super-short distance radio of the short distance using the antenna for radio - middle distance were made switchable to the method of arbitration with the

communication-mode change means Since radio was started after being able to perform proper use of the communication mode according to a communication link application, and reduction of power consumption being possible and acquiring the information for a communication link required for radio by super-short distance communication link While reducing information transmission to unrelated equipment, the time amount compaction to communication link initiation is attained.

[0071] According to the radio communication equipment according to claim 8 to 11, moreover, with an antenna change means Since the communication mode made the class of antenna switchable as it is at either of the antenna for super-short distance radio, and the antenna for short-distance radio according to the existence of contact of a contact terminal Since radio was started after acquiring the information for a communication link required for radio by super-short distance communication link Since the time amount compaction to communication link initiation was attained, and it was made to output from an antenna further, without amplifying a signal while reducing information transmission to unrelated equipment when it was super-short distance radio, it is useful to reduction of power consumption.

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**TECHNICAL PROBLEM**

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[Problem(s) to be Solved by the Invention] However, by the above-mentioned conventional approach, when there are many devices for a communication link on the outskirts, while it is necessary to choose the target communications partner and selection of a device becomes a troublesome activity out of many received devices ID,

in order to do the activity which chooses reception and a communications partner from all the devices of communication link within the limits for information, there is a problem that time amount is light by communication link initiation.

[0004] Then, this invention is made paying attention to the unsolved technical problem which such a Prior art has, and it aims at offering a suitable radio communication equipment shortening time amount until a communication link is established, and the program for radio equipment control while it is suitable to specify a communications partner simply.

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**MEANS**

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[Means for Solving the Problem] In order to attain the above-mentioned purpose, the radio communication equipment according to claim 1 concerning this invention is characterized by having a switchable communication-mode change means for a super-short distance radio means to perform radio of a super-short distance, a short-distance radio means to perform radio of a short distance, and the radio by said super-short distance radio means and the radio by said short-distance radio means.

[0006] With such a configuration, it is possible to communicate the data signal in a super-short distance with a super-short distance radio means. It is possible to communicate the data signal in a short distance with a short-distance radio means. Further with a communication-mode change means Since it is possible to change to the communication link by super-short distance means of communications or the radio by short-distance means of communications, it is useful to reduction of power

consumption, compaction of the time amount to data communication initiation, etc. by using the communication mode according to a communication link application properly.

[0007] Here, suppose that a super-short distance is the distance from a contact location to several cm, and a short distance is the distance from the maximum distance of a super-short distance to several m. Moreover, a radio communication equipment according to claim 2 is characterized by having a switchable communication-mode change means for a super-short distance radio means to perform radio of a super-short distance, a middle distance radio means and the middle-distance radio, and the radio by said super-short distance radio means and the radio by said middle distance radio means.

[0008] That is, it is possible to communicate the data signal in a super-short distance with a super-short distance radio means. It is possible to communicate a middle-distance data signal with a middle distance radio means. Further with a communication-mode change means Since it is possible to change to the communication link by super-short distance means of communications or the radio by middle distance means of communications, it is useful to reduction of power consumption, compaction of the time amount to data communication initiation, etc. by using the communication mode according to a communication link application properly.

[0009] Here, suppose that middle distance is the distance from the maximum distance of a short distance to dozens of meters. Moreover, it is characterized by communicating radio information required in order that invention concerning claim 3 may perform radio other than a communications partner and said super-short distance in a radio communication equipment according to claim 1 or 2 with said super-short distance radio means.

[0010] That is, it is characterized by communicating radio information required in order for a communications partner and said radio means to perform radio by said contact process means of communications. That is, it was made to communicate with a super-short distance radio means about radio information required in order to perform radio [ say / receiving the proper ID for identifying a communications partner required in order to perform radio etc. from a communications partner, or notifying the discernment ID of a self-equipment proper etc. to a communications partner conversely ]. Therefore, since it becomes the communication link of a super-short distance, while preventing transmitting the password and identification information of equipment to unrelated equipment, it is useful to becoming possible to start radio easily and shortening the time amount to communication link initiation using the acquired radio information.

[0011] Moreover, the radio communication equipment according to claim 4 is characterized by having a switchable communication-mode change means for the antenna for radio, a radio means to perform radio of a data signal using the antenna for radio concerned, a contact terminal, the contact process means of communications that communicates said data signal through the contact terminal concerned, and the radio by said radio means and the communication link by said contact process means of communications.

[0012] Since with such a configuration it is possible to perform radio using the antenna for radio with a radio means, it is possible to perform the communication link which minded the contact terminal by contact process means of communications and it is still more possible to change the radio by the radio means or the communication link by contact process means of communications with a communication-mode change means, proper use of the communication mode according to a communication link application can be performed, and it is convenient. Moreover, it is characterized by communicating radio information required in order that invention concerning claim 5 may perform radio with a communications partner and said radio means in a radio communication equipment according to claim 4 by said contact process means of communications.

[0013] That is, it was made to communicate by contact process means of communications about radio information required in order to perform radio [ say / receiving the proper ID for identifying a communications partner required in order to perform radio etc. from a communications partner, or notifying the discernment ID of a self-equipment proper etc. to a communications partner conversely ]. Therefore, since it becomes the communication link of 1 to 1 by contact, while preventing transmitting the password and identification information of equipment to unrelated equipment, it is useful to becoming possible to start radio easily and shortening the time amount to communication link initiation using the acquired radio information.

[0014] Moreover, the radio communication equipment according to claim 6 is characterized by having a switchable communication-mode change means for a communications partner, the electromagnetic means of communications which performs radio of said data signal by electromagnetic induction, and the radio by said radio means and the radio by said electromagnetic means of communications using the antenna for radio, a radio means to perform radio of a data signal using the antenna for radio concerned, a coil, and the coil concerned.

[0015] That is, electromagnetic means of communications is made to perform radio by the electromagnetic induction using a coil. Since this method can be communicated by

little power consumption, it is using properly with the radio by the antenna for radio by the application, and it becomes possible to reduce power consumption. Moreover, it is characterized by communicating radio information required in order that invention concerning claim 7 may perform radio with said communications partner and said radio means in a radio communication equipment according to claim 6 by said electromagnetic means of communications.

[0016] That is, it was made to communicate by electromagnetic means of communications about the radio information that receive the proper ID for identifying a communications partner required in order for a radio means to perform radio etc. from a communications partner, or the discernment ID of a self-equipment proper etc. is conversely notified to a communications partner. Therefore, it is useful to becoming possible to start radio easily and bringing forward the time amount to initiation of radio using the acquired radio information, while it reduces transmitting the password and identification information of equipment to another unrelated equipment, since the radio by electromagnetic induction turns into a communication link of a short distance extremely.

[0017] Moreover, the radio communication equipment according to claim 8 concerning this invention The antenna for short-distance radio, the antenna for super-short distance radio, and a contact terminal, When the contact terminal of other equipments contacts a radio means to perform radio using either among said antenna for short-distance radio, and said antenna for super-short distance radio, and said contact terminal of self-equipment It is characterized by having the antenna change means which changes automatically the antenna which said radio means uses to said antenna for super-short distance radio.

[0018] The short-distance radio which used the antenna for short-distance radio with the radio means when it was such a configuration, When it is possible to perform super-short distance radio using the antenna for super-short distance radio and the contact terminal of other equipments contacts the contact terminal of self-equipment further Since the antenna which a radio means uses is automatically changed to the antenna for super-short distance radio with an antenna change means If the equipment is equipped with the same contact terminal when performing radio among other radio communication equipments which exist close at hand, super-short distance radio can be performed only by contacting the contact terminals, and it is convenient.

[0019] Moreover, invention concerning claim 9 is characterized by equipping said radio means with the signal amplifier which amplifies the data signal outputted from said

antenna in the radio communication equipment according to claim 8. That is, a radio means amplifies the data signal outputted from an antenna by the signal amplifier.

Moreover, invention concerning claim 10 is characterized by said radio means amplifying said data signal by said signal amplifier only in the radio which used said antenna for short-distance radio in the radio communication equipment according to claim 9.

[0020] That is, in the radio using the antenna for super-short distance radio of a super-short distance, a radio means is outputted from an antenna, without amplifying the data signal by the signal amplifier, and is useful to holding down consumption of useless power. Moreover, it is characterized by performing the communication link of radio information required in order that invention concerning claim 11 may perform radio with a communications partner and said radio means in a radio communication equipment according to claim 8 to 10 by the radio using said antenna for short-distance radio.

[0021] That is, the radio using the antenna for super-short distance radio was made to perform the communication link of the radio information that receive the proper ID for identifying a communications partner required in order for a radio means to perform radio etc. from a communications partner, or the discernment ID of a self-equipment proper etc. is conversely notified to a communications partner. Therefore, since it becomes the communication link of a short distance extremely, while reducing transmitting the password and identification information of equipment to another unrelated equipment, it is useful to becoming possible to start short-distance radio easily, and bringing forward the time amount to the improvement in security, and initiation of radio using the acquired radio information.

[0022] Moreover, the radio communications system according to claim 12 concerning this invention is equipped with a radio communication equipment according to claim 1 to 11 two or more, communicates the information for radio required in order to perform a communications partner and radio, and is characterized by performing said communications partner and radio using the acquired radio information concerned by the radio of a super-short distance. That is, it is the system which performs radio with the said equipments using a radio communication equipment according to claim 1 to 11, and since the operation effectiveness overlaps, it omits a publication.

[0023] Moreover, the program for radio device control according to claim 13 concerning this invention The super-short distance radio step which is a program for radio device control for controlling the radio processing in a radio communication equipment according to claim 1, and performs radio processing of a super-short



distance with said super-short distance radio means. The short-distance radio step which performs radio processing of a short distance with said short-distance radio means, it is characterized by having the communications processing change step which performs change processing with the super-short distance radio processing by said super-short distance radio step, and the short-distance radio processing by said short-distance radio step with said communication-mode change means.

[0024] Moreover, the program for radio device control according to claim 14 concerning this invention. The super-short distance radio step which is a program for radio device control for controlling the radio processing in a radio communication equipment according to claim 2, and performs radio processing of a super-short distance with said super-short distance radio means. The middle distance radio step which performs middle-distance radio processing with said middle distance radio means, it is characterized by having the communications processing change step which performs change processing with the super-short distance radio processing by said super-short distance radio step, and the middle distance radio processing by said middle distance radio step with said communication-mode change means.

[0025] Moreover, it is characterized by performing the communication link of radio information required in order that invention concerning claim 15 may perform radio other than a communications partner and said super-short distance in the program for radio device control according to claim 13 or 14 in said super-short distance radio step. Moreover, the program for radio device control according to claim 16 concerning this invention. It is a program for radio device control for controlling the radio processing in a radio communication equipment according to claim 4. The radio step which performs radio processing of a data signal performed using said antenna for radio by said radio means. The contact process communication link step which performs the communications processing of said data signal performed by said contact process means of communications through said contact terminal. It is characterized by having the communications processing change step which performs change processing with the radio processing by said radio step, and the communications processing by said contact process communication link step with said communication-mode change means.

[0026] Moreover, invention concerning claim 17 is characterized by performing the communications processing of radio information required for the radio processing performed in a communications partner and said radio step in said contact process communication link step in the program for radio device control according to claim 16. Moreover, the program for radio device control according to claim 18 concerning this

invention. It is a program for radio device control for controlling the radio processing in a radio communication equipment according to claim 6. The radio step which performs radio processing of a data signal performed using said antenna for radio by said radio means. The electromagnetic communication link step which performs radio processing of said data signal performed by the electromagnetic induction using a coil by said electromagnetic means of communications, it is characterized by having the communications processing change step which performs change processing with the radio processing by said radio step, and the radio processing by said electromagnetic communication link step with said communication-mode change means.

[0027] Moreover, invention concerning claim 19 is characterized by performing the communications processing of radio information required for the radio processing performed in said communications partner and said radio step in said electromagnetic communication link step in the program for radio device control according to claim 18. Moreover, the program for radio device control according to claim 20 concerning this invention. It is a program for radio device control for controlling the radio processing in a radio communication equipment according to claim 6. The radio step which performs radio processing performed by said radio means using either among said antenna for short-distance radio, and said antenna for super-short distance radio, The radio processing change step which changes automatically the radio processing performed in said radio step to super-short distance radio processing in which said antenna for super-short distance radio was used when the contact terminal of other equipments contacts said contact terminal of self-equipment. It is characterized by preparation \*\*\*\*\*.

[0028] Moreover, invention concerning claim 21 is characterized by performing signal magnification processing which amplifies the data signal outputted from said antenna by said signal amplifier in said radio step in the program for radio device control according to claim 20. Moreover, it is characterized by invention concerning claim 22 performing said signal magnification processing only in the radio using said antenna for short-distance radio in said radio step in the program for radio control according to claim 21.

[0029] Moreover, invention concerning claim 23 is characterized by performing the communications processing of radio information required for the radio processing performed in a communications partner and said radio step in the radio step using said antenna for super-short distance radio in the program for radio device control according to claim 20 to 22. The program for radio device control according to claim 13 to 23 is a program for controlling the radio processing in a radio communication

equipment according to claim 1 to 9 here, and since the effectiveness overlaps, it omits a publication.

[0030]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained based on a drawing. Drawing 1 thru/ or drawing 9 are drawings showing the gestalt of operation of the radio communication equipment concerning this invention. First, the 1st example of a configuration of the radio communication equipment concerning this invention is explained based on drawing 1. Drawing 1 is the block diagram showing the 1st example of a configuration of the radio communication equipment concerning this invention. As shown in drawing 1, the 1st example 1 of a configuration of a radio communication equipment 1st radio control section 1a, 1st antenna 1b for radio, and 1st short-distance Radio Communications Department 1c, it has composition equipped with 1d of terminals for a contact communication link, contact process communications department 1e, 1f of 1st communication-mode change section, 1g of 1st storage section and 1st CPU1h, 1st ROM1i, 1st RAM1j, and 1st bus 1k.

[0031] 1st radio control-section 1a controls radio processing, and performs generation of the transmission data in the transmitting processing and reception of a data signal by wireless, and transmission of a processing instruction. 1st antenna 1b for radio is an antenna for performing radio of a short distance. 1st short-distance Radio Communications Department 1c performs processing which outputs the data for transmission from 1st antenna 1b for radio b to a short distance according to the instruction from 1st radio control-section 1a.

[0032] 1d of terminals for a contact communication link is for transmitting data by contact for the same terminal of other equipments. Contact process communications department 1e is for performing data transceiver processing between other communication equipment through 1d of terminals for a contact communication link, and processes a monitor, data transmission processing, etc. of a contact condition. 1f of 1st communication-mode change section is for carrying out control which changes the short-distance radio by 1st short-distance Radio Communications Department 1c, and the communication link by contact process communications department 1e, and performs only one processing according to the communication mode set up by actuation of the control unit which is not illustrated.

[0033] 1g of 1st storage section is for memorizing the data transmitted and received by the communication link through radio or 1d of terminals for a contact communication link. 1st CPU1h is for performing the program for control memorized

by 1st ROM1i for controlling processing of each part of the above. 1st ROM1i has memorized the above-mentioned program for control, and also has memorized the identification information of an equipment proper etc.

[0034] 1st RAM1j is for memorizing required data, in case 1st CPU1h performs the above-mentioned program for control. 1st bus 1k is a data communication way for performing data communication between each part of the above. Next, more concrete actuation is explained based on drawing 4. Drawing 4 is drawing showing signs that the communication devices of the same type are performing radio, (a) is drawing showing the situation of radio using 1d of terminals for a contact communication link by contact process communications department 1e, and (b) is drawing showing the situation of radio using the 1st antenna for radio by 1st short-distance Radio Communications Department 1c.

[0035] First, the communication link using 1d of terminals for a contact communication link is performed by contacting 1st terminal 40a for a contact communication link of the 1st radio communication equipment 40, and 2nd terminal 41a for a contact communication link of the 2nd radio communication equipment 41, as shown in drawing 4 (a). In the gestalt of this operation, transmission and reception of the information for a communication link required in order to communicate with a communications partner to perform short-distance radio by the super-short distance radio by this terminal for a contact communication link will be performed.

[0036] Furthermore, as information for a communication link, information, such as identification information of the equipment proper memorized by 1st ROM1i and a protocol of short-distance radio, is transmitted and received beforehand, it is read from 1st ROM1i by contact process communications department 1e, and transmission processing is performed. And if the communication link information on a communications partner is acquired by this communication link, the change of a communication mode will be performed by 1f of 1st communication-mode change section in the short-distance radio method by 1st short-distance Radio Communications Department 1c from the super-short distance radio method by contact process communications department 1e. Furthermore, if a communication mode changes to the short-distance radio method by 1st short-distance Radio Communications Department 1c, after 1st short-distance Radio Communications Department 1c reads the data to transmit from the 1st storage section based on the communication link information on the acquired communications partner and performs modulation processing etc., as shown in drawing 4 (b), it will perform short-distance radio processing which outputs the data signal modulated from the antenna of

self-equipment. In addition, processing of these each part is performed by 1st ROM11's memorizing and performing the program for \*\*\*\* control by 1st CPU1h. [0037] Furthermore, the flow of actuation of the control program in the 1st example 1 of a configuration of a radio communication equipment is explained based on drawing 7. Drawing 7 is a flow chart which shows processing of the program for control in the 1st example 1 of a configuration of a radio communication equipment of operation. As shown in drawing 7, it shifts to step S700 first, and by the control unit which is not illustrated, it is set as the super-short distance radio mode in which the contact terminal for a communication link according to a communication mode to contact process communications department 1e was used, and shifts to step S702. [0038] At step S702, change processing is performed by 1f of 1st communication-mode change section, and it shifts to step S704 by it so that it may become the communication mode for which the communication mode used the contact terminal for a communication link. If it shifts to step S704, the communications processing by contact process communications department 1e will be started, and it will shift to step S706. At step S706, when it judges that 1d of terminals for a contact communication link judged and contacted [ whether the same terminal for a contact communication link of other communication devices was contacted, and ] (Yes), it shifts to step S708, and when that is not right, (No) stands by until it contacts.

[0039] Since contact was checked when it shifted to step S708, transceiver processing of communication link information is performed, and further, it judges whether the information for a communication link from a communications partner was acquired, and when judged with having acquired communication link information (Yes), it shifts to step S710, and when that is not right, (No) continues processing until it contacts and acquires the information for a communication link. In the gestalt of this operation here, the information for a communication link also transmits the thing of self-equipment to a communications partner, and after both are in the condition with the mutual information for a communication link, it shifts to the following step. [0040] When it shifts to step S710, a communication mode is automatically set as short-distance radio mode, and shifts to step S712. At step S712, change processing is performed by 1f of 1st communication-mode change section, and it shifts to step S714 by it so that a communication mode may turn into a short-distance radio method by 1st short-distance Radio Communications Department 1c. At step S714, the short-distance radio which used the 1st antenna for radio is started by 1st short-distance Radio Communications Department 1c. Here, 1st short-distance

Radio Communications Department 1c reads the data to transmit from 1g of 1st storage section, and short-distance radio performs modulation processing to which the data signal is compounded with a subcarrier, and is performed with changing into the data for transmission and outputting from 1st antenna 1for radio b.

[0041] Furthermore, the 2nd example of a configuration of the radio communication equipment concerning this invention is explained based on drawing 2. Drawing 2 is the block diagram showing the 2nd example of a configuration of the radio communication equipment concerning this invention. As shown in drawing 2, the 2nd example 2 of a configuration of a radio communication equipment With 2nd radio control section 2a, the 2nd antenna 2 for radio, and the 2nd short distance Radio Communications Department 2 it has composition equipped with coil 2d for radio, electromagnetic Radio Communications Department 2e, 2f of 2nd communication-mode change section, 2g of 2nd storage section and 2nd CPU2h, 2nd ROM2i, 2nd RAM2j, and 2nd bus 2k.

[0042] 2nd radio control-section 2a controls radio processing, and performs generation of the transmission data in the transmitting processing and reception of a data signal by wireless, and transmission of a processing instruction. 2nd antenna 2b for radio is an antenna for performing radio of a short distance. 2nd short-distance Radio Communications Department 2c performs processing which outputs the data for transmission from 2nd antenna 2b for radio to a short distance according to the instruction from 2nd radio control-section 2a.

[0043] Coil 2d for radio is for causing electromagnetic induction and carrying out the radio transmission of the data by approach with the same coil. Electromagnetic Radio Communications Department 2e performs processing for transmitting data to other communication equipment using the electromagnetic induction by coil 2d for radio, and performs processing for transmitting and receiving data by electromagnetic induction. 2f of 2nd communication-mode change section is for carrying out control which changes the short-distance radio by 2nd short-distance Radio Communications Department 2c, and the super-short distance radio by electromagnetic Radio Communications Department 2e, and is made to perform only one processing according to the communicate mode set up by actuation of the control unit which is not illustrated.

[0044] 2g of 2nd storage section is for memorizing the data transmitted and received by the super-short distance radio which used short-distance radio and coil 2d for radio which used 2nd antenna 2b for radio. 2nd CPU2h is for performing the program for control memorized by 2nd ROM2i for controlling processing of each part of the

above. 2nd ROM2i has memorized the above-mentioned program for control, and also has memorized the identification information of an equipment proper.

[0045] 2nd RAM2i is for memorizing required data, in case 1st CPU2h performs the above-mentioned program for control. 2nd bus 2k is a data communication way for performing data communication between each part of the above. Next, more concrete actuation is explained based on drawing 5. Drawing 5 is drawing showing signs that radio by the communication devices of the same type is performed, (a) is drawing showing the communicative situation using coil 2d for radio by electromagnetic communications department 2e, and (b) is drawing showing the situation of radio using 2nd antenna 2b for radio by 2nd short-distance Radio Communications Department 2c.

[0046] First, the communication link using coil 2d for radio is performed by bringing 1st output section 50a of the 3rd radio communication equipment 50, and 2nd output section 51a of the 4th radio communication equipment 51 close to the distance which can communicate, as shown in drawing 5 (a). In the gestalt of this operation, transmission and reception of communication link information required in order to perform a target communications partner and short-distance radio will be performed by the radio using electromagnetic induction with this coil for radio. In order to perform a radio transmission, modulation processing etc. is performed, and the data of the information for a communication link which information, such as identification information of the equipment proper memorized by 2nd ROM2i and a communicative protocol, was beforehand transmitted as communication link information, and was read from 2nd ROM2i by electromagnetic Radio Communications Department 2e are transmitted to a phase hand through coil 2d for radio.

[0047] And if the communication link information on a communications partner is acquired by the super-short distance radio by electromagnetic Radio Communications Department 2e, the change of a communication mode will be performed by 2f of 2nd communication-mode change section in the short-distance radio method by 1st short-distance Radio Communications Department 2c from the super-short distance radio method by electromagnetic Radio Communications Department 2e. Furthermore, if a communication mode changes to the short-distance radio method by 2nd short-distance Radio Communications Department 2c, after 2nd short-distance Radio Communications Department 2c reads the data to transmit from 2g of 2nd storage section based on the communication link information on the communications partner acquired by super-short distance radio and performs modulation processing etc., as shown in drawing 5 (b), it will perform the short-distance radio processing which

outputs the data signal modulated from the antenna of self-equipment. In addition, processing of these each part is performed by 2nd ROM2i's memorizing and performing the program for \*\*\*\* control by 2nd CPU2h.

[0048] Furthermore, the flow of actuation of the control program in the 2nd example 2 of a configuration of a radio communication equipment is explained based on drawing 8. Drawing 8 is a flow chart which shows processing of the program for control in the 2nd example 2 of a configuration of a radio communication equipment of operation. As shown in drawing 8, it shifts to step S800 first, and by the control unit which is not illustrated, it is set as the super-short distance radio mode in which coil 2d for radio according a communication mode to electromagnetic Radio Communications Department 2e was used, and shifts to step S802.

[0049] At step S802, change processing is performed by 2f of 2nd communication-mode change section, and it shifts to step S804 by it so that it may become the super-short distance radio method with which the communication mode used coil 2d for radio. If it shifts to step S804, the super-short distance radio processing by electromagnetic Radio Communications Department 2e will be started, and it will shift to step S806. At step S806, when judged with coil 2d for radio having judged whether it moved within limits which can radiocommunicate by electromagnetic induction with the same coil for radio of other communication devices, and having moved (Yes), it shifts to step S808, and when that is not right, (No) stands by until it moves to within the limits.

[0050] Since the migration to within the limits was checked when it shifted to step S808, transceiver processing of the information for a communication link is performed, and further, it judges whether the information for a communication link from a communications partner was acquired, and processing is continued until it shifts to step S810 when judged with having acquired communication link information (Yes), (No) moves to within the limits when that is not right, and it acquires the information for a communication link. In the gestalt of this operation here, the information for a communication link also transmits the thing of self-equipment to a communications partner, and after both are in the condition with the mutual information for a communication link, it shifts to the following step.

[0051] When it shifts to step S810, a communication mode is automatically set as short-distance radio mode, and shifts to step S812. At step S812, change processing is performed by 2f of 2nd communication-mode change section, and it shifts to step S814 by it so that a communication mode may turn into a short-distance radio method by 2nd short-distance Radio Communications Department 2c. At step S814,

the short-distance radio which used 2nd antenna 2b for radio is started by 2nd short-distance Radio Communications Department 2c. Here, 2nd short-distance Radio Communications Department 2c reads the data to transmit from 2g of 2nd storage section, and short-distance radio performs modulation processing to which the data signal is compounded with a subcarrier, and is performed with changing into the data for transmission and outputting from 2nd antenna 2b for radio.

[0052] Furthermore, the 3rd example of a configuration of the radio communication equipment concerning this invention is explained based on drawing 3. Drawing 3 is the block diagram showing the 3rd example of a configuration of the radio communication equipment concerning this invention. As shown in drawing 3, the 3rd example 3 of a configuration of a radio communication equipment The 3rd radio control-section 3a, Radio Communications Department 3b, and antenna 3c for super-short distance radio, It has composition equipped with antenna 3d for short-distance radio, antenna change section 3e, 3f of signal amplifiers, 3g of 3rd storage section and 3rd CPU3h, 3rd ROM3i, 3rd RAM3j, and 3rd bus 3k.

[0053] 3rd radio control-section 3a controls the communications processing of the data based on wireless, and performs control of transmitting processing or reception, generation of the data for a communication link, etc. Radio Communications Department 3b performs radio using antenna 3f for super-short distance radio c, or antenna 3d for short-distance radio, and processes based on the control instruction from 3rd radio control-section 3a. Antenna 3c for super-short distance radio is an antenna for performing the communications partner and super-short distance radio which are performed when the contact terminal of other equipments contacts the contact terminal of the self-equipment which is not illustrated.

[0054] Antenna 3d for short-distance radio is an antenna for performing the communications partner and the short-distance radio of the purpose. Antenna change section 3e changes an antenna to antenna 3c for super-short distance radio automatically, when the contact terminal of other equipments contacts the contact terminal of self-equipment, and when performing radio of a short distance, it performs processing automatically changed with the antenna for short-distance radio. Here, according to the existence of contact of a contact terminal, and the acquisition situation of communication link information, an antenna is changed automatically.

[0055] 3f of signal amplifiers is for amplifying the signal outputted from antenna 3d for short-distance radio. When performing super-short distance radio which used antenna 3c for super-short distance radio in the gestalt of this operation here, it outputs from an antenna, without amplifying a signal. 3g of 3rd storage section is for

memorizing the data transmitted and received by super-short distance radio and short-distance radio.

[0056] 3rd CPU3h is for performing the program for control memorized by 3rd ROM3i for controlling processing of each part of the above. 3rd ROM3i has memorized the above-mentioned program for control, and also has memorized the identification information of an equipment proper, and information for a communication link, such as a password. 3rd RAM3j is for memorizing required data, in case 3rd CPU3h performs the above-mentioned program for control.

[0057] 3rd bus 3k is a data communication way for performing data communication between each part of the above. Next, more concrete actuation is explained based on drawing 6. Drawing 6 is drawing showing signs that radio by the communication devices of the same type which have a contact terminal is performed, (a) is drawing showing the situation using antenna 3c for super-short distance radio of super-short distance radio, and (b) is drawing showing the situation using antenna 3d for short-distance radio of short-distance radio.

[0058] First, radio mode is set up by actuation of the control unit which is not illustrated. 3rd radio control-section 3a transmits mode information to antenna change section 3e according to this mode setting. Here, when the contact terminal of self-equipment touches the contact terminal of other equipments, processing which chooses antenna 3c for super-short distance radio by antenna change section 3e is performed. If Radio Communications Department 3b is the radio of a super-short distance in the gestalt of this operation, transmitting processing of the data for transmission (here information for a communication link) will be performed without minding 3f of signal amplifiers.

[0059] On the other hand, the contact terminal of self-equipment contacts the contact terminal of other equipments, and does not shine, and when communication link information is acquisition ending, antenna change section 3e chooses antenna 3d for short-distance radio, and Radio Communications Department 3b makes the data signal for transmission amplify in 3f of signal amplifiers, and outputs the data signal for transmission from antenna 3d for short-distance radio. That is, the communication link using antenna 3c for super-short distance radio is performed by contacting 3rd terminal 60a for a contact communication link of the 5th radio communication equipment 60, and 4th terminal 61a for a contact communication link of the 6th radio communication equipment 61, as shown in drawing 6 (a). In the gestalt of this operation, transmission and reception of the information for a communication link required in order for this super-short distance radio to perform a target

communications partner and short-distance radio will be performed. As information for a communication link, the information on the identification information of the equipment proper memorized by 3rd ROM2i, the password for obtaining communication link authorization, etc. is transmitted beforehand. By 3rd radio control-section 3a In order to perform a radio transmission, modulation processing etc. is performed, and the data of the information for a communication link read from 3rd ROM3i are outputted by Radio Communications Department 3b from antenna 3 for super-short distance radio c.

[0060] And when acquiring the information for a communication link and performing a communications partner and short-distance radio As antenna 3d for short-distance radio is chosen by antenna change section 3e and it is shown in drawing 6 (b) The 5th radio communication equipment 60 and 6th radio communication equipment 61 are in the condition of having separated mutually within the limits of the short distance, and short-distance radio is performed with outputting the signal amplified by Radio Communications Department 3b from antenna 3d for short-distance radio through 3f of signal amplifiers.

[0061] Furthermore, the flow of actuation of the control program in the 3rd example 3 of a configuration of a radio communication equipment is explained based on drawing 10. Drawing 9 is a flow chart which shows processing of the program for control in the 3rd example 3 of a configuration of a radio communication equipment of operation. As shown in drawing 9, when it shifts to step S900 first, it judges whether there was any contact of contact terminals and there is contact (Yes), it shifts to step S902, and when that is not right, (No) shifts to step S908.

[0062] When it shifts to step S902, antenna 3c for super-short distance radio is chosen by antenna change section 3e, and it shifts to step S904 by it. If it shifts to step S904, by Radio Communications Department 3b, super-short distance radio using antenna 3c for super-short distance radio will be performed, and it will shift to step S906. At step S906, when judged with having judged whether radio was completed or not and having ended (Yes), communications processing is ended, and when that is not right, (No) shifts to step S900.

[0063] When judged with on the other hand judging and acquiring whether the information for a communication link is acquired when there is no contact of a contact terminal and it shifts to step S908 at step S900 (Yes), it shifts to step S910, and when that is not right, (No) shifts to step S900. If it shifts to step S910, by antenna change section 3e, antenna 3d for short-distance radio will be chosen as an antenna which Radio Communications Department 3b uses, and it will shift to step S912.

[0064] At step S912, by Radio Communications Department 3b, short-distance radio using antenna 3d for short-distance radio is performed, and it shifts to step S906. As mentioned above, since it becomes possible to reduce that those information is received by unrelated equipment since according to the gestalt of the above-mentioned implementation the radio of a super-short distance is made to perform the discernment data of a communication device proper, and transmission and reception of a password in case radio is performed, it is useful to improvement in security.

[0065] Moreover, since the information for a communication link is quickly [ simply and ] acquirable in the 1st example 1 of a configuration which acquired the information for a communication link by the super-short distance communication link by 1d of terminals for a contact communication link, it is possible to shorten the time amount to radio initiation. Moreover, since the information for a communication link is simply acquirable in the 2nd example 2 of a configuration which acquired the information for a communication link by the super-short distance communication link by coil 2d for radio, it is possible to shorten the time amount to radio initiation.

[0066] Moreover, since it communicates by changing to the antenna for super-short distance radio automatically when there is contact of a contact terminal in the 3rd example 3 of a configuration which changed the class of antenna used for a communication link according to the existence of contact of a contact terminal, the information for a communication link can be acquired simply and quickly, the time amount to radio initiation can be shortened, and it is convenient. Moreover, in the 3rd example 3 of a configuration, since he is trying to output from an antenna at the time of the super-short distance radio using the antenna for super-short distance radio, without amplifying a signal, it becomes reduction of power consumption.

[0067] The short-distance radio processing by 1st radio control section 1a and 1st short-distance Radio Communications Department 1c which are shown in drawing 1 here It corresponds to a short-distance radio means according to claim 1 and a radio means according to claim 4. 1st antenna 1b for radio It corresponds to the antenna for radio according to claim 4. 1d of terminals for a contact communication link It corresponds to a contact terminal according to claim 4, contact process communications department 1e corresponds to claim 4 and contact process means of communications according to claim 5, and 1f of 1st communication-mode change section supports claims 1 and 4 and the communication-mode change means of five publications.

[0068] Furthermore, the short-distance radio processing by 2nd radio control section

2a and 2nd short-distance Radio Communications Department 2c which are shown in drawing 2 It corresponds to a short-distance radio means according to claim 1 and claim 6, and the radio means of seven publications. 2nd antenna 2b for radio It corresponds to the antenna for radio according to claim 6. Coil 2d for radio It corresponds to a coil according to claim 6, electromagnetic Radio Communications Department 2e corresponds to claim 6 and electromagnetic means of communications according to claim 7, and 2f of 2nd communication-mode change section corresponds to claims 1 and 4 and the communication-mode change means of six publications. [0069] Furthermore, the radio by the 3rd radio control-section 3a and Radio Communications Department 3b which are shown in drawing 3 corresponds to a wireless transmitting means according to claim 8 to 11, and 3d of antenna change sections supports the antenna change means according to claim 8.

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[Translation done.]

**\* NOTICES \***

**JPO and NCIP are not responsible for any damages caused by the use of this translation.**

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

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**DESCRIPTION OF DRAWINGS**

[Brief Description of the Drawings]

[Drawing 1] It is the block diagram showing the 1st example of a configuration of the radio communication equipment concerning this invention.

[Drawing 2] It is the block diagram showing the 2nd example of a configuration of the radio communication equipment concerning this invention.

[Drawing 3] It is the block diagram showing the 3rd example of a configuration of the radio communication equipment concerning this invention.

[Drawing 4] It is drawing showing signs that the communication devices of the same

type are performing radio, and (a) is drawing showing the situation of radio using 1d of terminals for a contact communication link by contact process communications department 1e, and (b) is drawing showing the situation of radio using the 1st antenna for radio by 1st short-distance Radio Communications Department 1c.

[Drawing 5] It is drawing showing signs that radio by the communication devices of the same type is performed, and (a) is drawing showing the communicative situation using coil 2d for radio by electromagnetic communications department 2e, and (b) is drawing showing the situation of radio using 2nd antenna 2b for radio by 2nd short-distance Radio Communications Department 2c.

[Drawing 6] It is drawing showing signs that radio by the communication devices of the same type is performed, and (a) is drawing showing the situation of the radio by super-short distance radio, and (b) is drawing showing the situation of the radio by short-distance radio or middle distance radio.

[Drawing 7] It is the flow chart which shows processing of the program for control in the 1st example 1 of a configuration of a radio communication equipment of operation.

[Drawing 8] It is the flow chart which shows processing of the program for control in the 2nd example 2 of a configuration of a radio communication equipment of operation.

[Drawing 9] It is the flow chart which shows processing of the program for control in the 3rd example 3 of a configuration of a radio communication equipment of operation.

[Description of Notations]

1 1st Example of Configuration of Radio Communication Equipment

1a The 1st radio control section

1b The 1st antenna for radio

1c The 1st short-distance Radio Communications Department

1d Terminal for a contact communications link

1e Contact process communications department

1f The 1st communication-mode change section

2 2nd Example of Configuration of Radio Communication Equipment

2a The 2nd radio control section

2b The 2nd antenna for radio

2c The 2nd short-distance Radio Communications Department

2d Coil for radio

2e Electromagnetic Radio Communications Department

2f The 2nd communication-mode change section

3 3rd Example of Configuration of Radio Communication Equipment

3a The 3rd radio control section

3b Radio Communications Department

3c The antenna for super-short distance radio

3d Antenna for short-distance radio

3e Antenna change section

3f Signal amplifier

50 1st Radio Communication Equipment

50a The 1st terminal for a contact communication link

51 2nd Radio Communication Equipment

51a The 2nd terminal for a contact communication link

60 3rd Radio Communication Equipment

60a The 1st output section

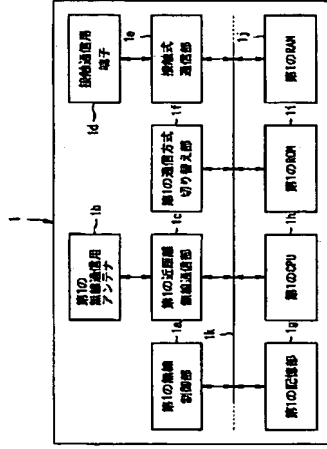
61 4th Radio Communication Equipment

61a The 2nd output section

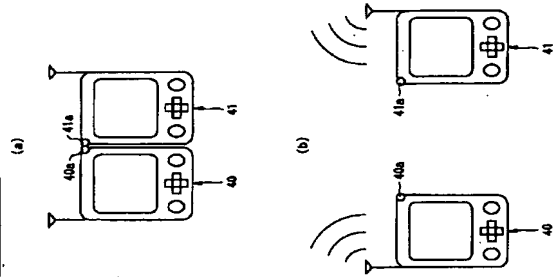
70 5th Radio Communication Equipment

71 6th Radio Communication Equipment

[Drawing 1]



[Drawing 4]



[Translation done.]

\* NOTICES \*

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1.This document has been translated by computer. So the translation may not reflect the original precisely.

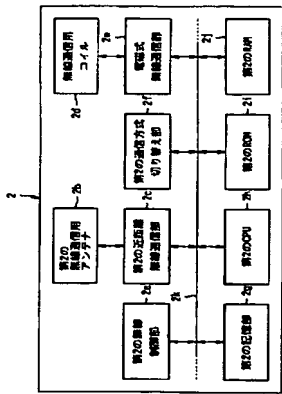
2.\*\*\*\* shows the word which can not be translated.

3.In the drawings, any words are not translated.

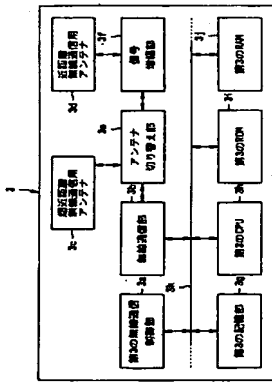
DRAWINGS



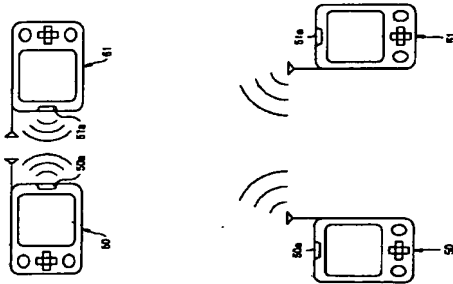
[Drawing 2]



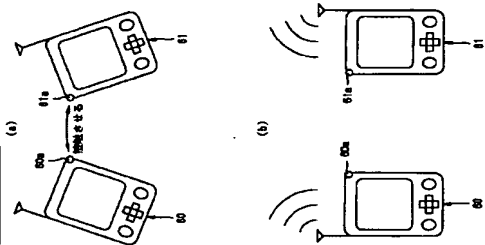
[Drawing 3]



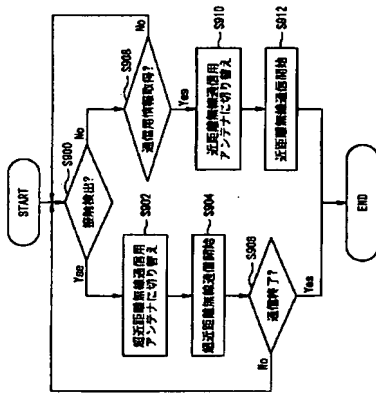
[Drawing 5]



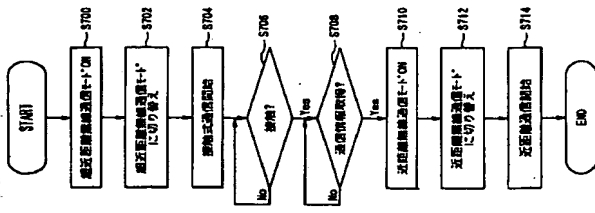
[Drawing 6]



[Drawing 9]

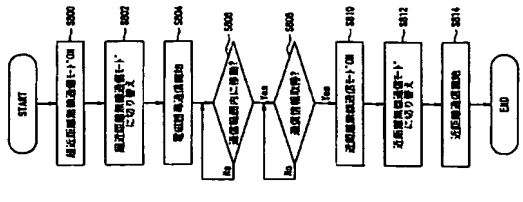


[Drawing 7]



[Translation done.]

[Drawing 8]





前記無線通信手段によって前記無線通信用アンテナを用いて行われるデータ信号の無線通信処理を行う無線通信ステップと、

前記接触式通信手段によって前記接触端子を介して行われる前記データ信号の通信処理を行う接触式通信ステップと、

前記通信方式切り替え手段によって前記無線通信ステップによる無線通信処理と前記接触式通信ステップによる無線通信処理との切り替え処理を行う通信処理切り替えステップと、を備えることを特徴とする無線通信装置制御プログラム。

【請求項17】 通信相手と前記無線通信ステップにおいて行われる無線通信処理に必要な無線通信情報の通信処理を、前記接触式通信ステップにおいて行うようになしていることを特徴とする請求項16記載の無線通信装置。

【請求項18】 請求項6記載の無線通信装置における無線通信処理を制御するための無線通信装置制御プログラムであって、

前記無線通信手段によって前記無線通信処理を行う無線通信ステップと、

前記電磁波通信手段によってコイルを用いた電磁誘導によって行われる前記データ信号の無線通信処理を行う電磁式通信ステップと、前記通信方式切り替え手段によって前記無線通信ステップによる無線通信処理と前記電磁式通信ステップによる無線通信処理との切り替え処理を行う通信処理切り替えステップと、を備えることを特徴とする無線通信装置制御プログラム。

【請求項19】 前記通信相手と前記無線通信ステップにおいて行われる無線通信処理に必要な無線通信情報の通信処理を、前記電磁波通信手段によって行うようになしていることを特徴とする請求項18記載の無線通信装置制御プログラム。

【請求項20】 請求項6記載の無線通信装置における無線通信処理を制御するための無線通信装置制御プログラムであって、

前記無線通信手段によって前記近距離無線通信用アンテナ及び前記超近距離無線通信用アンテナのうちいずれか一方を利用して行われる無線通信処理を行う無線通信ステップと、自装置の前記接触端子に他装置の接触端子が接触したときに、前記無線通信ステップにおいて行う無線通信処理と前記超近距離無線通信用アンテナを利用した超近距離無線通信処理とを自動的に切り替える無線通信処理切り替えステップと、を備えることを特徴とする無線通信装置制御プログラム。

【請求項21】 前記無線通信ステップにおいては、前記アンテナから出力するデータ信号の増幅を行う信号増幅処理を行うようになっていることを特徴とする請求項20記載の無線通信装置。

【請求項22】 前記無線通信ステップにおいては、前記近距離無線通信用アンテナを用いた無線通信においてのみ前記信号処理を行うようになっていることを特徴とする請求項21記載の無線通信装置制御プログラム。

【請求項23】 通信相手と前記無線通信ステップにおいて行われる無線通信処理に必要な無線通信情報の通信処理を、前記超近距離無線通信用アンテナを利用した無線通信ステップにおいて行うようになっていることを特徴とする請求項20乃至請求項22のいずれかに記載の無線通信装置制御プログラム。

【発明の詳細な説明】

【0001】  
【発明の属する技術分野】本発明は、無線によってデータ信号の送受信を行う装置に係り、特に、通信相手を簡単に特定し、通信開始までの時間を早めるのに好適な無線通信装置に関する。

【0002】  
【従来の技術】従来の無線通信では、接続したい相手の機器1Dを知らない場合、無線電波が届く範囲内にある全ての機器に対して、機器1Dなどの無線通信を行いために必要なその機器の情報を送信してもらい、それらの情報を受信して、利用者がその中から通信相手を選択して接続する方法が用いられていた。

【0003】

【発明が解決しようとする課題】しかしながら、上記従来の方法では、周辺に多数の通信対象機器がある場合に、受信した多くの機器1Dの中から、目的の通信相手を選ぶ必要があり、機器の選択が煩わしい作業になると共に、通信範囲内の機器全てから情報を受け取り、且つ、通信相手を選択する作業を行うため通信開始までに時間がかかるという問題がある。

【0004】そこで、本発明は、このような従来の技術の有する未解決の問題に着目してなされたものであって、通信相手を簡単に特定するのに好適であると共に、通信が確立するまでの時間を短縮するのに好適な無線通信装置及び無線装置制御プログラムを提供することを目的としている。

【0005】

【課題を解決するための手段】上記目的を達成するために、本発明に係る請求項1記載の無線通信装置は、超近距離の無線通信を行う超近距離無線通信手段と、近距離の無線通信を行う近距離無線通信手段と、前記超近距離無線通信手段による無線通信と前記近距離無線通信手段による無線通信とを切り替え可能な通信方式切り替え手段と、を備えることを特徴としている。

【0006】このような構成であれば、超近距離無線通信手段によって超近距離におけるデータ信号の通信を行うことが可能であり、近距離無線通信手段によって近距離におけるデータ信号の通信を行うことが可能であり、

更に、通信方式切り替え手段によって、超近距離通信手段による通信が、近距離通信手段による無線通信のいずれかに切り替えることが可能であるので、通信用途に応じた通信の使い分けを行うことで、消費電力の低下やデータ通信開始までの時間の短縮等に役立つ。

【0007】ここで、超近距離とは、接触位置から数センチまでの距離であり、近距離とは、超近距離の最大距離から数メートルまでの距離であることとする。また、請求項2記載の無線通信装置は、超近距離の無線通信を行う超近距離無線通信手段と、中距離の無線通信を行う中距離無線通信手段と、前記超近距離無線通信手段による無線通信と前記中距離無線通信手段による無線通信とを切り替え可能な通信方式切り替え手段と、を備えることを特徴とする。

【0008】つまり、超近距離無線通信手段によって超近距離におけるデータ信号の通信を行うことが可能であり、中距離無線通信手段によって中距離におけるデータ信号の通信を行うことが可能であり、更に、通信方式切り替え手段によって、超近距離通信手段による通信か、中距離通信手段による無線通信のいずれかに切り替えることが可能であるので、通信用途に応じた通信の使い分けを行うことで、消費電力の低減やデータ通信開始までの時間の短縮等に役立つ。

【0009】ここで、中距離とは、近距離の最大距離から数十メートルまでの距離であることとする。また、請求項3に係る発明は、請求項1又は請求項2記載の無線通信装置において、通信相手と前記超近距離以外の無線通信を行うために必要な無線通信情報の通信を、前記超近距離無線通信手段によって行うようになっていることを特徴としている。

【0010】つまり、通信相手と前記無線通信手段によって無線通信を行うために必要な無線通信情報の通信を、前記接触式通信手段によって行うようになっていることを特徴としている。つまり、無線通信を行うために必要な通信相手を識別するための固有1D等を通信相手から受信したり、逆に自装置固有の識別1D等を通信相手に通知したりするといった、無線通信を行うために必要となる無線通信の通信を超近距離無線通信手段によって行うようにした。従って、超近距離の通信となつて、装置のパスワードや識別情報を関係のない装置に伝送するといったことを防ぐと共に、取得した無線通信情報によって、無線通信の開始を容易に行うことが可能となり通信開始までの時間を短縮するのに役立つ。

【0011】また、請求項1記載の無線通信装置は、無線通信用アンテナと、当該無線通信用アンテナを用いてデータ信号の無線通信を行う無線通信手段と、接触端子と、当該接触端子を介して前記データ信号の通信を行う接触式通信手段と、前記無線通信手段による無線通信と前記接触式通信手段による通信とを切り替え可能な通信方式切り替え手段と、を備えることを特徴としている。

【0012】このような構成であれば、無線通信手段によって、無線通信用アンテナを用いた無線通信を行うことが可能であり、接触式通信手段によって接触端子を介した通信を行うことが可能であり、更に、通信方式切り替え手段によって、無線通信手段による無線通信が、接触式通信手段による通信のいずれかを切り替えることが可能であるので、通信用途に応じた通信の使い分けができ、便利である。また、請求項5に係る発明は、請求項4記載の無線通信装置において、通信相手と前記無線通信手段によって無線通信を行うために必要な無線通信情報の通信を、前記接触式通信手段によって行うようになっていることを特徴としている。

【0013】つまり、無線通信を行うために必要な通信相手を識別するための固有1D等を通信相手から受信したり、逆に自装置固有の識別1D等を通信相手に通知したりするといった、無線通信を行うために必要な無線通信情報の通信を接触式通信手段によって行うようにした。従って、接触による1対1の通信となるので、装置のパスワードや識別情報を関係のない装置に伝送するといったことを防ぐと共に、取得した無線通信情報によって、無線通信の開始を容易に行うことが可能となり通信開始までの時間を短縮するのに役立つ。

【0014】また、請求項6記載の無線通信装置は、無線通信用アンテナと、当該無線通信用アンテナを用いてデータ信号の無線通信を行う無線通信手段と、コイルと、当該コイルを用いて通信相手と前記データ信号の無線通信を電磁誘導によって行う電磁式通信手段と、前記無線通信手段による無線通信と前記電磁式通信手段による無線通信とを切り替え可能な通信方式切り替え手段と、を備えることを特徴としている。

【0015】つまり、電磁式通信手段によって、コイルを用いた電磁誘導による無線通信を行うようにしたものである。この方式は少ない消費電力で通信を行うことが可能であるため用途によって無線通信用アンテナによる無線通信と使い分けすることで、消費電力を低減することが可能となる。また、請求項7に係る発明は、請求項6記載の無線通信装置において、前記通信相手と前記無線通信手段によって無線通信を行うために必要な無線通信情報の通信を、前記電磁式通信手段によって行うようになっていることを特徴としている。

【0016】つまり、無線通信手段によって無線通信を行うために必要な通信相手を識別するための固有1D等を通信相手から受信したり、逆に自装置固有の識別1D等を通信相手に通知したりするといった、無線通信情報を、電磁誘導による無線通信によって行うようにした。従って、電磁誘導による無線通信は、極めて近距離の通信となるので、装置のパスワードや識別情報を関係のない別の装置に伝送するといったことを低減すると共に、取得した無線通信情報によって、無線通信の開始を容易に行うことが可能となり、無線通信の開始までの時間を早め



上記制御用プログラムを実行する際に必要なデータを記憶するためのものである。第1のバス11kは、上記各部間のデータ通信を行うためのデータ通信路である。次に、より具体的な動作を、図4に基づいて説明する。図4は、同タイプの通信装置10dにより無線通信を行っている様子を示す図であり、(a)は、接触式通信部1eによる接触通信用端子1dを用いた無線通信の様子を示す図であり、(b)は、第1の近距離無線通信部1cによる第1の無線通信用アンテナを用いた無線通信の様子を示す図である。

【0035】まず、接触通信用端子1dを用いた通信は、図4(a)に示すように、第1の無線通信装置40の第1の接触通信用端子40aと第2の無線通信装置41の第2の接触通信用端子41aとを接触させることによって行われる。本実施の形態においては、この接触通信用端子による超近距離無線通信によって、近距離無線通信を行いたい通信相手と通信を行うために必要な通信情報の送受信が行われることになる。

【0036】更に、通信情報としては、予め、第1のROM11に記憶された装置固有の識別情報や、近距離無線通信のプロトコル等の情報が送受信されるようになっている。接触式通信部1cによって第1のROM11から読み出され、伝送処理が行われる。そして、この通信によって通信相手の通信情報を取得すると、第1の通信方式切り替え部1fによって、接触式通信部1eによる超近距離無線通信方式から第1の近距離無線通信部1cによる近距離無線通信方式へと通信方式の切り替えが行われる。更に、通信方式が第1の近距離無線通信部1cによる近距離無線通信方式に切り替わると、第1の近距離無線通信部1cは、取得した通信相手の通信情報に基づき、伝送するデータを第1の記憶部から読み出し、変調処理等を行った後に、図4(b)に示すように、装置のアンテナから変調されたデータ信号を出力する。近距離無線通信処理を行う。なお、これら各部の処理は第1のCPU11hによって第1のROM11に記憶された制御用プログラムを実行することによって行われる。

【0037】更に、無線通信装置の第1の構成例1における制御プログラムの動作の流れを図7に基づいて説明する。図7は、無線通信装置の第1の構成例1における制御プログラムの動作を示すフローチャートである。図7に示すように、まずステップS700に移行し、図示しない操作部によって通信方式を接触式通信部1eによる通信用接触端子を用いた超近距離無線通信モードに設定しステップS702に移行する。

【0038】ステップS702では、第1の通信方式切り替え部1fによって、通信方式が通信用接触端子を用いた通信方式になるように切り替え処理が行われステップS704に移行する。ステップS704に移行すると、接触式通信部1eによる通信処理が開始されステップS706に移行する。ステップS706では、接触式

通信用端子1dが他の通信装置の同様の接触通信用端子と接触したか否かを判定し、接触したと判定された場合(Yes)はステップS708に移行し、そうでない場合(No)は、接触するまで待機する。

【0039】ステップS708に移行した場合は、接触が確認されたので、通信情報の送受信処理を行い、更に、通信相手からの通信情報を取得したか否かを判定し、通信情報を取得したと判定された場合(Yes)はステップS710に移行し、そうでない場合(No)は、接触したまま待機する。

【0040】ステップS710に移行した場合は、通信方式が自動的に近距離無線通信モードに設定されステップS712に移行する。ステップS712では、第1の通信方式切り替え部1fによって、通信方式が第1の近距離無線通信部1cによる近距離無線通信方式となるように切り替え処理が行われステップS714に移行する。ステップS714では、第1の近距離無線通信部1cにより、第1の無線通信用アンテナを用いた近距離無線通信が開始される。ここで、近距離無線通信は、第1の近距離無線通信部1cが、伝送するデータを第1の記憶部1gから読み出し、そのデータ信号を搬送波と合成する変調処理を行い伝送用データに変換して、第1の無線通信用アンテナ1bから出力することで行われる。

【0041】更に、本発明に係る無線通信装置の第2の構成例を図2に基づいて説明する。図2は、本発明に係る無線通信装置の第2の構成例を示すブロック図である。図2に示すように、無線通信装置の第2の構成例2は、第2の無線制御部2aと、第2の無線通信用アンテナ2dと、第2の近距離無線通信部2eと、無線通信方式切り替え部2fと、第2の記憶部2gと、第2のCPU2hと、第2のROM2iと、第2のRAM2jと、第2のバス2kとを、備えた構成となっている。

【0042】第2の無線通信制御部2aは、無線通信処理を制御するもので、無線によるデータ信号の送受信処理及び受信処理における伝送データの生成や、処理命令の伝送を行う。第2の無線通信用アンテナ2bは、近距離無線通信を行うためのアンテナである。第2の近距離無線通信部2cは、第2の無線通信制御部2aからの命令に応じて、第2の無線通信用アンテナ2bから伝送用データを近距離に対して出力する処理を行うものである。

【0043】無線通信用コイル2dは、同様のコイルとの接近によって電磁誘導を引き起こしデータ信号を無線伝送するためのものである。電磁式無線通信部2eは、無線通信用コイル2dによる電磁誘導を利用してデータを他

の通信機器に伝送するための処理を行うもので、電磁誘導によってデータを送受信するための処理を行う。第2の通信方式切り替え部2fは、図示しない操作部の操作によって設定された通信モードに応じて、第2の近距離無線通信部2cによる近距離無線通信と、電磁式無線通信部2eによる超近距離無線通信と、を切り替えて一方の処理だけを行うようにする制御をするためのものである。

【0044】第2の記憶部2gは、第2の無線通信用アンテナ2bを用いた近距離無線通信や無線通信用コイル2dを用いた超近距離無線通信によって送受信されるデータを記憶するためのものである。第2のCPU2hは、上記各部の処理を制御するための第2のROM2iに記憶された制御用プログラムを実行するためのものである。第2のROM2iは、上記した制御用プログラムに記憶されている他に、装置固有の識別情報を記憶している。

【0045】第2のRAM2jは、第1のCPU2hが上記制御用プログラムを実行する際に必要なデータを記憶するためのものである。第2のバス2kは、上記各部間のデータ通信を行うためのデータ通信路である。次に、より具体的な動作を、図5に基づいて説明する。図5は、同タイプの通信装置10dによる無線通信を行っている様子を示す図であり、(a)は、電磁式通信部2eによる無線通信用コイル2dを用いた通信の様子を示す図であり、(b)は、第2の近距離無線通信部2cによる第2の無線通信用アンテナ2bを用いた無線通信の様子を示す図である。

【0046】まず、無線通信用コイル2dを用いた通信は、図5(a)に示すように、第3の無線通信装置50の第1の出力部50aと第4の無線通信装置51の第2の出力部51aとを通信可能な距離まで近づけることによって行われる。本実施の形態においては、この無線通信用コイルによる電磁誘導を利用した無線通信によって、対象の通信相手と近距離無線通信を行うために必要な通信情報の送受信が行われることになる。通信情報としては、予め、第2のROM2iに記憶された装置固有の識別情報や、通信のプロトコル等の情報が伝送されるようになっている。電磁式無線通信部2eによって、第2のROM2iから読み出された通信情報のデータは、無線伝送を行うために変調処理等が行われ、無線通信用コイル2dを介して相手先に伝送される。

【0047】そして、電磁式無線通信部2eによる超近距離無線通信によって、通信相手の通信情報を取得すると、第2の通信方式切り替え部2fによって、電磁式無線通信部2eによる超近距離無線通信方式から第1の近距離無線通信部2cによる近距離無線通信方式へと通信方式の切り替えが行われる。更に、通信方式が第2の近距離無線通信部2cによる近距離無線通信方式に切り替わると、第2の近距離無線通信部2cは、超近距離無線

通信によって取得した通信相手の通信情報に基づき、伝送するデータを第2の記憶部2gから読み出し、変調処理等を行った後に、図5(b)に示すように、自装置のアンテナから変調されたデータ信号を出力する近距離無線通信処理を行う。なお、これら各部の処理は第2のCPU2hによって第2のROM2iに記憶された制御用プログラムを実行することによって行われる。

【0048】更に、無線通信装置の第2の構成例2における制御プログラムの動作の流れを図8に基づいて説明する。図8は、無線通信装置の第2の構成例2における制御プログラムの動作処理を示すフローチャートである。図8に示すように、まずステップS800に移行し、図示しない操作部によって通信方式を電磁式無線通信部2eによる無線通信用コイル2dを用いた超近距離無線通信モードに設定しステップS802に移行する。【0049】ステップS802では、第2の通信方式切り替え部2fによって、通信方式が無線通信用コイル2dを用いた超近距離無線通信方式になるように切り替え処理が行われステップS804に移行する。ステップS804に移行すると、電磁式無線通信部2eによる超近距離無線通信処理が開始されステップS806に移行する。ステップS806では、無線通信用コイル2dが他の通信装置の同様の無線通信用コイルとの電磁誘導による無線通信可能な範囲内に移動したか否かを判定し、移動したと判定された場合(Yes)はステップS808に移行し、そうでない場合(No)は、範囲内に移動するまで待機する。

【0050】ステップS808に移行した場合は、範囲内への移動が確認されたので、通信情報の送受信処理を行い、更に、通信相手からの通信情報を取得したか否かを判定し、通信情報を取得したと判定された場合(Yes)はステップS810に移行し、そうでない場合(No)は、範囲内に移動した通信情報を取得するまで処理を続ける。ここで、本実施の形態においては、通信情報は、自装置のものも通信相手に伝送し、両者が互いの通信情報を有した状態となってから次のステップに移行するようになっている。

【0051】ステップS810に移行した場合は、通信方式が自動的に近距離無線通信モードに設定されステップS812に移行する。ステップS812では、第2の通信方式切り替え部2fによって、通信方式が第2の近距離無線通信部2cによる近距離無線通信方式となるように切り替え処理が行われステップS814に移行する。ステップS814では、第2の近距離無線通信部2cによって、第2の無線通信用アンテナ2bを用いた近距離無線通信が開始される。ここで、近距離無線通信は、第2の近距離無線通信部2cが、伝送するデータを第2の記憶部2gから読み出し、そのデータ信号を搬送波と合成する変調処理を行い伝送用データに変換し、第2の無線通信用アンテナ2bから出力すること

行われる。

【0052】更に、本発明に係る無線通信装置の第3の構成例を図3に基づいて説明する。図3は、本発明に係る無線通信装置の第3の構成例を示すブロック図である。図3に示すように、無線通信装置の第3の構成例3は、第3の無線通信制御部3aと、無線通信部3bと、超近距離無線通信用アンテナ3cと、近距離無線通信用アンテナ3dと、アンテナ切り替え部3eと、信号増幅部3fと、第3の配電部3gと、第3のCPU3hと、第3のROM3iと、第3のRAM3jと、第3のバス3kと、を備えた構成となっている。

【0053】第3の無線通信制御部3aは、無線によるデータの通信処理を制御するものであり、送信処理、又は、受信処理の制御や、通信データの生成等を行う。無線通信部3bは、超近距離無線通信用アンテナ3c、又は、近距離無線通信用アンテナ3dを利用して無線通信を行うもので、第3の無線通信制御部3aからの制御命令に基づいて処理を行う。超近距離無線通信用アンテナ3cは、図示しない自装置の接続端子に他装置の接続端子が接触したときに実行される通信相手と超近距離無線通信を行うためのアンテナである。

【0054】近距離無線通信用アンテナ3dは、目的の通信相手と近距離無線通信を行うためのアンテナである。アンテナ切り替え部3eは、自装置の接続端子に他装置の接続端子が接触したときに自動的にアンテナを超近距離無線通信用アンテナ3cに切り替え、近距離の無線通信を行うときに近距離無線通信用アンテナに自動的に切りかえる処理を行うものである。ここでは、接続端子の接触の有無及び通信情報の取得状況に応じてアンテナを自動的に切り替えるようになっている。

【0055】信号増幅部3fは、近距離無線通信用アンテナ3dから出力する信号を増幅するためのものである。ここで、本実施の形態においては、超近距離無線通信用アンテナ3cを利用して超近距離無線通信を行う場合は、信号を増幅せずにアンテナから出力するようになっている。第3の配電部3gは、超近距離無線通信及び近距離無線通信によって送受信されるデータを記憶するためのものである。

【0056】第3のCPU3hは、上記各部の処理を制御するための第3のROM3iに記憶された制御プログラムを実行するためのものである。第3のROM3iは、上記した制御プログラムを記憶している他に、装置固有の識別情報や、パスワード等の通信情報を記憶している。第3のRAM3jは、第3のCPU3hが上記した制御プログラムを実行する際に必要なデータを記憶するためのものである。

【0057】第3のバス3kは、上記各部間のデータ通信を行うためのデータ通信路である。次に、より具体的な動作を、図6に基づいて説明する。図6は、接続端子を有する同タイプの通信装置同士による無線通信を行っ

ている様子を示す図であり、(a)は、超近距離無線通信用アンテナ3cを利用した超近距離無線通信の様子を示す図であり、(b)は、近距離無線通信用アンテナ3dを利用した近距離無線通信の様子を示す図である。

【0058】まず、図示しない操作部の操作によって、無線通信モードの設定を行う。第3の無線通信制御部3aはこのモード設定に応じて、モード情報をアンテナ切り替え部3eに伝送する。ここで、自装置の接続端子が他装置の接続端子と接触している場合は、アンテナ切り替え部3eによって超近距離無線通信用アンテナ3cを選択する処理を行う。本実施の形態において、無線通信部3bは、超近距離の無線通信であれば、信号増幅部3fを介さずに、伝送用データ(ここでは通信情報)の送信処理を行うことになる。

【0059】一方、自装置の接続端子が他装置の接続端子と接触してらず、且つ、通信情報が取得済みである場合は、アンテナ切り替え部3eは、近距離無線通信用アンテナ3dを選択し、無線通信部3bは、信号増幅部3fにおいて送信用のデータ信号を増幅させて近距離無線通信用アンテナ3dから伝送用データ信号を出力する。つまり、超近距離無線通信用アンテナ3cを用いた通信は、図6(a)に示すように、第5の無線通信装置60の第3の接続通信用端子60aと第6の無線通信装置61の第4の接続通信用端子61aとを接続させることによって行われる。本実施の形態においては、この超近距離無線通信によって、対象の通信相手と近距離無線通信を行うために必要な通信情報の送受信が行われることになる。通信情報としては、予め、第3のROM2iに記憶された装置固有の識別情報や、通信相手を得るためのパスワード等の情報が伝送されるようになっており、第3の無線通信制御部3aによって、第3のROM3iから読み出された通信情報のデータは、無線伝送を行うために変調処理等が行われ、無線通信部3bによって超近距離無線通信用アンテナ3cから出力される。

【0060】そして、通信情報を取得し、通信相手と近距離無線通信を行うときは、アンテナ切り替え部3eによって近距離無線通信用アンテナ3dが選択され、図6(b)に示すように、第5の無線通信装置60と第6の無線通信装置61とは近距離の範囲内で互いに離れた状態にあり、無線通信部3bにより信号増幅部3fを介して近距離無線通信用アンテナ3dから、増幅された信号を出力することで近距離無線通信が行われる。

【0061】更に、無線通信装置の第3の構成例3における制御プログラムの動作の流れを図10に基づいて説明する。図9は、無線通信装置の第3の構成例3における制御プログラムの動作処理を示すフローチャートである。図9に示すように、まずステップS900に移行し、接続端子同士の接触があったか否かを判定し、接触があった場合(Yes)はステップS902に移行し、そうでない場合(No)はステップS908に移行する。

【0062】ステップS902に移行した場合は、アンテナ切り替え部3eによって、超近距離無線通信用アンテナ3cが選択されステップS904に移行する。ステップS904に移行すると、無線通信部3bによって、超近距離無線通信用アンテナ3cを利用した超近距離無線通信を行い、無線通信部3bによって、超近距離無線通信用アンテナ3cを利用して超近距離無線通信を行っているか否かを判定し、取得していると判定したと判定された場合(Yes)は通信処理を終了し、そうでない場合(No)はステップS900に移行する。

【0063】一方、ステップS900で、接続端子の接触が無くステップS908に移行した場合は、通信情報を取得しているか否かを判定し、取得していると判定された場合(Yes)はステップS910に移行し、そうでない場合(No)はステップS900に移行する。ステップS910に移行すると、アンテナ切り替え部3eによって、無線通信部3bの利用するアンテナとして近距離無線通信用アンテナ3dを選択してステップS912に移行する。

【0064】ステップS912では、無線通信部3bによって、近距離無線通信用アンテナ3dを利用した近距離無線通信を行い、ステップS906に移行する。以上、上記実施の形態によれば、無線通信を行う際に、通信装置固有の識別データや、パスワードの送受信を近距離の無線通信によって行うようにしているため、無線装置にそれらの情報が受信されることを低減することが可能となるのでセキュリティの向上に役立つ。

【0065】また、接続通信用端子1dによる超近距離通信によって通信情報を取得するようにした第1の構成例1では、簡易、且つ、迅速に通信情報を取得することができ、また、無線通信用コイル2dによる超近距離通信によって通信情報を取得するようにした第2の構成例2では、簡易に通信情報を取得することができ、第2の無線通信開始までの時間を短縮することが可能である。また、無線通信部3bから出力される信号を増幅せずにアンテナから出力するようにしているため、消費電力の低減となる。

【0066】また、接続端子の接触の有無に応じて、通信に使用するアンテナの種類を切り替えるようにした第3の構成例3では、接続端子の接触があったときに超近距離無線通信用アンテナに自動的に切り替え、通信を行うので、簡易、且つ、迅速に通信情報を取得することができ、また、無線通信開始までの時間を短縮することができ、また、第3の構成例3では、超近距離無線通信用アンテナを利用した超近距離無線通信のときは、信号を増幅せずにアンテナから出力するようにしているため、消費電力の低減となる。

【0067】ここで、図1に示す、第1の無線制御部1a及び第1の近距離無線通信部1cによる近距離無線通信処理は、請求項1記載の近距離無線通信手段及び請求項4記載の無線通信手段に対応し、第1の無線通信用アンテナ1bは、請求項4記載の無線通信用アンテナに対応

応し、接続通信用端子1dは、請求項4記載の接続端子に対応し、接続式通信部1eは、請求項4及び請求項5記載の接続式通信手段に対応し、第1の通信方式切り替え部1fは、請求項1、4、5記載の通信方式切り替え手段に対応している。

【0068】更に、図2に示す、第2の無線制御部2a及び第2の近距離無線通信部2cによる近距離無線通信処理は、請求項1記載の近距離無線通信手段及び請求項6、7記載の無線通信手段に対応し、第2の無線通信用アンテナ2bは、請求項6記載の無線通信用アンテナに対応し、無線通信用コイル2dは、請求項6記載のコイルに対応し、電磁式無線通信部2eは、請求項6及び請求項7記載の電磁式通信手段に対応し、第2の通信方式切り替え部2fは、請求項1、4、6記載の通信方式切り替え手段に対応する。

【0069】更に、図3に示す、第3の無線通信制御部3a及び無線通信部3bによる無線通信は、請求項8～11記載の無線通信手段に対応し、アンテナ切り替え部3dは、請求項8記載のアンテナ切り替え手段に対応している。

【0070】

【発明の効果】以上説明したように、本発明に係る請求項1乃至請求項7記載の無線通信装置によれば、無線通信用アンテナを用いた近距離～中距離の無線通信と、超近距離無線通信とを通信方式切り替え手段によって任意の方式に切り替え可能としたので、通信用途に応じた通信方式の使い分けができ、消費電力の低減が可能であり、超近距離通信によって無線通信に必要な通信情報を取得してから無線通信を開始するようにしたので、無線装置な装置への情報送信を低減すると共に、通信開始までの時間短縮が可能となる。

【0071】また、請求項8乃至請求項11記載の無線通信装置によれば、アンテナ切り替え手段によって、通信方式はそのままに、接続端子の接触の有無に応じてアンテナの種類を超近距離無線通信用アンテナと近距離無線通信用アンテナとのいずれかに切り替え可能としたので、超近距離通信によって無線通信に必要な通信情報を取得してから無線通信を開始するようにしたので、無線装置な装置への情報送信を低減すると共に、通信開始までの時間短縮が可能となり、更に、超近距離無線通信のときに信号を増幅せずにアンテナから出力するようにしたので、消費電力の低減に役立つ。

【図面の簡単な説明】

【図1】本発明に係る無線通信装置の第1の構成例を示すブロック図である。

【図2】本発明に係る無線通信装置の第2の構成例を示すブロック図である。

【図3】本発明に係る無線通信装置の第3の構成例を示すブロック図である。

【図4】同タイプの通信装置同士により無線通信を行っ

(11)

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ている様子を示す図であり、(a)は、接触式通信部1  
eによる接触通信端子1dを用いた無線通信の様子を  
示す図であり、(b)は、第1の近距離無線通信部1c  
による第1の無線通信用アンテナを用いた無線通信の様  
子を示す図である。

【図5】同タイプの通信装置同士による無線通信を行っ  
ている様子を示す図であり、(a)は、電磁式通信部2  
eによる無線通信用コイル2dを用いた通信の様子を示  
す図であり、(b)は、第2の近距離無線通信部2cによ  
る第2の無線通信用アンテナ2bを用いた無線通信の  
様子を示す図である。

【図6】同タイプの通信装置同士による無線通信を行っ  
ている様子を示す図であり、(a)は、超近距離無線通  
信による無線通信の様子を示す図であり、(b)は、近  
距離無線通信、又は、中距離無線通信による無線通信  
の様子を示す図である。

【図7】無線通信装置の第1の構成例1における制御用  
プログラムの動作処理を示すフローチャートである。

【図8】無線通信装置の第2の構成例2における制御用  
プログラムの動作処理を示すフローチャートである。

【図9】無線通信装置の第3の構成例3における制御用  
プログラムの動作処理を示すフローチャートである。

【符号の説明】

1 無線通信装置の第1の構成例  
1a 第1の無線制御部  
1b 第1の無線通信用アンテナ  
1c 第1の近距離無線通信部  
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2 無線通信装置の第2の構成例  
2a 第2の無線制御部  
2b 第2の無線通信用アンテナ  
2c 第2の近距離無線通信部  
2d 無線通信用コイル  
2e 電磁式無線通信部  
3 無線通信装置の第3の構成例  
3a 第3の無線制御部  
3b 無線通信部  
3c 超近距離無線通信用アンテナ  
3d 近距離無線通信用アンテナ  
3e アンテナ切り替え部  
3f 信号増幅部  
50 第1の無線通信装置  
50a 第1の接触通信用端子  
51 第2の無線通信装置  
51a 第2の接触通信用端子  
60 第3の無線通信装置  
60a 第1の出力部  
61 第4の無線通信装置  
61a 第2の出力部  
70 第5の無線通信装置  
71 第6の無線通信装置

接触通信用端子

接触式通信部

第1の通信方式切り替え部

無線通信装置の第2の構成例

第2の無線制御部

第2の無線通信用アンテナ

第2の近距離無線通信部

無線通信用コイル

電磁式無線通信部

第2の通信方式切り替え部

無線通信装置の第3の構成例

第3の無線通信制御部

無線通信部

超近距離無線通信用アンテナ

近距離無線通信用アンテナ

アンテナ切り替え部

信号増幅部

第1の無線通信装置

第1の接触通信用端子

第2の無線通信装置

第2の接触通信用端子

第3の無線通信装置

第1の出力部

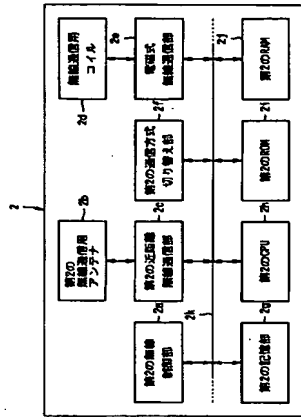
第4の無線通信装置

第2の出力部

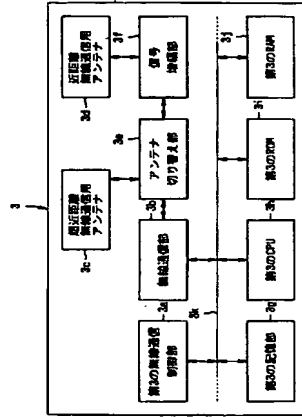
第5の無線通信装置

第6の無線通信装置

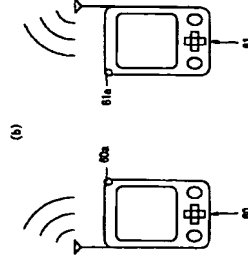
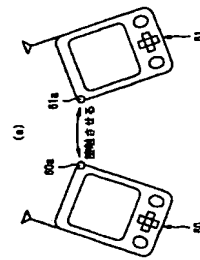
【図2】



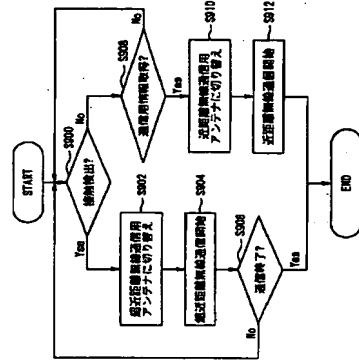
【図3】



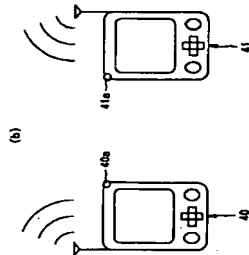
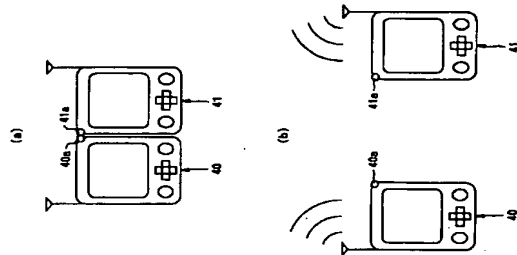
【図6】



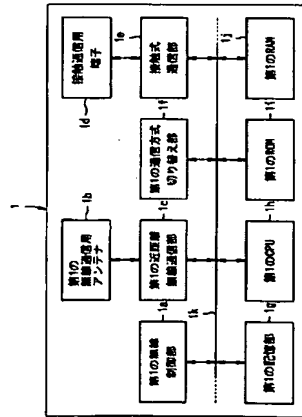
【図9】



【図4】

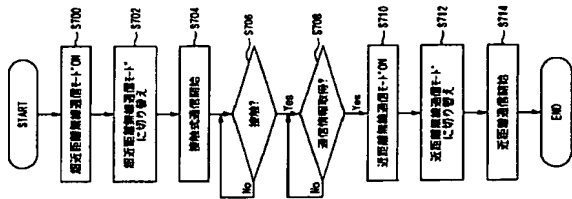


【図1】

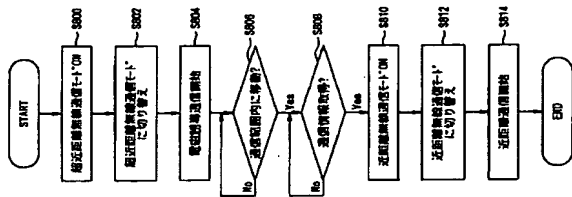




【図7】



【図8】



フロントページの続き

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